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THE COMING RUBBER SHORTAGE.

UNDER THIS DEFINITELY STARTLING CAPTION, Zorn & Leigh-Hunt (London), issue a four-page folder combining statistics and conclusions that will give pause to manufacturers and encouragement to planters. Were not the figures accurate and the conclusions apparently sound, one would take it as promotion talk. To quote the summary of the argument:

> "It will be noticed from the above statistics that for the next three years the increase in the world's production of rubber is not likely to exceed 6 or 7 per cent per annum. For the past five years the manufacturing demand has absorbed increases averaging more than 25 per cent per annum. Even if during 1921-1923 the rate of increasing demand should drop to 5 per cent per annum, the world's output will be fully used up. If the rate increases at anything more than 5 per cent we must inevitably reach a period of actual shortage. For instance, supposing that the average increase of the last five years should be cut down to one-half (12½ per cent instead of 25 per cent per annum) we might by the end of 1921 be faced with a shortage of 30,000 tons of rubber, to be followed by another two years' increasing stringency. The effect of an approaching shortage will make itself felt in the market some time before the position actually arises, as far-sighted consumers of rubber will not quietly wait to be 'caught short.' This no doubt explains why it is possible to-day to sell large quantities of rubber for a couple of years ahead at a substantial premium, over the 'spot' price; forward contracts in fact, have this year been made up to 2*s*. 10½*d*. per pound for delivery in 1921. In a word, in the absence of a setback in the trade of the world, there is practically no risk of rubber falling below its present price (except as a temporary fluctuation) while the chances of a rise are almost startling, in view of the statistical position revealed."

NO PROFITEERING IN RUBBER.

PROFITEERS try to palliate their rapacity with the plea that they did not press their advantage nearly as far as they had a chance. In much the same way an impeached British administrator in India once sought to extenuate his crimes of extortion by saying that when he considered the magnitude of his opportunities he was actually amazed at his moderation.

All the opportunities for gouging the public during and since the Great War have presented themselves to rubber manufacturers as well as to others, but to their credit it can truthfully be said that as a class they neither took unfair advantage of the rising price trend nor expressed regret at not having seized upon an abnormal state of trade as a pretext for exacting an unreasonable profit.

Proof of this fact is afforded by the price of rubber tires. In 1910 one popular make of 30 by 3½ fabric tire cost $26. In 1920 the same tire sells for $23.20. In 1910 the 33 by 4 size of the same tire sold for $44 and the 34 by 4 for $46.50, as compared with the 1920 prices of $38.60 and $39.60, respectively. Even more remarkable are the price decreases on the larger size tires. Yet, despite the fact that they have lessened the charge for their products, the tire manufacturers have had to cope with such drawbacks as a 250 per cent increase in the cost of cotton fabric and a 200 per cent rise in wages since 1910, not to mention greatly enhanced prices of compounding ingredients, building materials, machinery, etc.

Luckily, as was pointed out in a recent issue of this journal, raw rubber has remained the one normal commodity, that, despite all the commercial upheavals due to war and the enormous and world-wide demand for it, is still marketed at about the same old, antebellum price. But even the continued cheapness of the basic material does not account for the low cost of present-day rubber products. That explanation is to be found in the remarkable enterprise of rubber manufacturers, who, in the past few years, have, with the aid of chemists, engineers and efficiency experts,

devised most ingenious methods of quickening processes, new compounds and labor-saving machinery and by cultivating "human" relations with their employes, have not only speeded up production in a marvelous degree but are also turning out better goods at the lower price level.

PLANTATION FUTURES.

A FRIEND in the Far East advises the Editor of this journal that within five years the rubber plantations in India, Ceylon and the Malay States will be run by Soviets. This change of ownership will come about through a union of the Russians under Lenine and the Hindus and Mohammedans of India, who will throw off the "British Yoke." This would mean $10 rubber and a greatly lessened production. It would also be "Red Rubber" in the worst sense of the term.

If memory does not play us false the same source predicted the destruction of Malaysian plantations by disease before 1918. The disease came but the planters promptly stamped it out. So, too, will the red disease be stamped out in the Far Eastern possessions.

Nevertheless, not that we believe there is any such danger in sight, America as the biggest user of crude rubber should look far ahead for its supplies. The Philippines for planting are ideal once the Filipino will allow it to be done as the rest of the world does it. Then, too, there are our own rubber producers guayule and *Chrysothamnus*. Of the latter, Luther Burbank, the great plant wizard, in a letter to one of our staff, says that there is not a shadow of a doubt that by analysis of the different individual plants from different localities the rubber content of some will be found to be double that of others, and by starting with these high rubber content plants, and growing from these, any good plant breeder could originate a plant in a reasonably short period that would produce twice as much as the average wild ones do. He says this is a very moderate estimate, as it would not be surprising that a plant should be constructed which would produce ten times the results of the wild ones. Of course vigor is one of the things to be considered, and possibly compactness of growth, and other matters which would come up during the work of improvement.

A seven per cent content has already been found. Double this would be fourteen per cent and ten times as much would be a bonanza. Anyhow, fourteen or seventy, it's worth working for.

LEATHER RUBBER FOOTWEAR.

FOR some time rubber has been closely pressing leather in footwear lines. The rubber heel and the rubber fiber sole have won a notable victory over their leather counterparts. So far, however, the fine leather shoe has not been disturbed in its supremacy. The invention by the brilliant young English chemist, S. J. Peachey, of a new process of vulcanization by the use of sulphur dioxide and hydrogen sulphide opens new fields of which that now filled by leather footwear is one. By the new process goods of any color, and of almost any texture may be produced without heat or pressure. In other words the fine leather shoe can now be equalled and probably excelled in rubber. Furthermore, this may be done along rubber lines of building and cementing and without the vast array of special machines that are needed to stitch, polish, buff and shape leather shoes. It looks as if a footwear revolution were toward.

OPEN SHOP CITIES.

STUDENTS of industrial conditions attach no little significance to the figures given by the United States Census Bureau showing that the two open-shop cities, Los Angeles, California, and Akron, Ohio, have made a greater growth in the past ten years than any other two cities in their respective classes in the Union. Los Angeles scores a gain of 80.3 per cent and Akron an increase of 201.7 per cent, while Spokane, Washington, lost .2 per cent and Paterson, New Jersey, gained but 8.2 per cent. In both of the latter cities the closed shop still largely obtains, and agitators have done much to foment discord between capital and labor, discouraging not only the extension of old industries but also the starting of new enterprises. The metropolis of the Pacific Coast, on the other hand, has fought long and successfully for industrial freedom and has flourished like the proverbial green bay tree. And in like manner the nation's great rubber center in Ohio, free of the shackles of the closed shop, has prospered as has no other city of similar size in the country. There, under the piece-work system, production is always kept at high pitch, and there, the diligent, faithful worker can rest assured that extra pay will always reward his extra effort, instead of his wage being measured by the meager performance of the laggard and the shirker.

IN AN ARTICLE ON LABOR TURNOVER IN TIRE PRODUCTION, H. O. Smith of the Ajax Rubber Co., Inc., advances an excellent argument to encourage apprenticeship in the tire industry. He says:

> "There is a decided advantage in the fact that the tire business attracts the fellow from 18 to 25 years old who is thoughtful and considers his opportunities, and who, realizing when it is too late that he has missed the opportunity of an apprenticeship and learning a trade, finds in the tire industry a remaining chance to develop a possible earning power quite equal to that of the machinist, the carpenter, or the pattern maker. It requires only 60 to 90 days to become an efficient tire maker, while an apprenticeship in other trades usually covers three to four years. For this reason the tire industry can draw from the best untrained material in America."

Experiments With a New Cactus Rubber.

By Emmet S. Long.

IT HAS RECENTLY been the writer's privilege to experiment with a gum extracted from the American cactus and the results have so far been so entirely satisfactory that the subject should undoubtedly be of interest to every one connected with the rubber industry. The war has certainly disclosed the necessity, or at least the desirability, of producing on as large a scale as possible a portion at least of the rubber requirements of this country and for this reason, as well as for the economic betterment of the rubber industry itself, there has resulted considerable activity in the investigation of this important question.

Several years ago the writer had occasion to do considerable experimenting with the extraction and compounding with rubber of a gum derived from the Ocotillo plant, more particularly for the purpose of obtaining a gum which would replace guayule. This plant ranges from five to twenty-five feet in height, growing extensively in certain parts of Arizona and California. The results were satisfactory to a certain extent, but due to the solvent-distillation method of extraction employed, the gum contained a large percentage of resins which seriously affected the cure when used in large percentages in the compound. Later the destructive-distillation process with subsequent refining was evolved with the assistance of government chemists, and it is reported that a much superior product is now being produced in large quantities at the large plant in Arizona.

AN ARIZONA CACTUS.

The cactus gum mentioned at the beginning of this article is found in paying quantities in two different varieties of cactus, one the spineless, or cultivated cactus developed by Burbank and the other the prickly pear or wild species. Spineless cactus has been raised in many parts of Southern California as food for cattle. It was soon learned, however, that many cattle died, probably as a result of the insoluble gum content. The plant consists of a number of lobes somewhat similar in shape to an inverted hot water bottle, each lobe projecting outward and upward from the edge of the one underneath, the number of lobes depending upon the age of the plant. It is easily propagated by breaking off these lobes and planting them in the ground. The plant is very hardy and has the advantage of being easily cultivated upon practically worthless soil or in localities where the rainfall is very slight.

Prickly pear or *Opuntia vulgaris* grows extensively in many parts of Arizona, California, Nevada and other tropical parts of the United States. It is somewhat similar in structure to the spineless cactus, but is covered with long, sharp needles. It bears an edible fruit of a purplish color also covered with spines. Like the spineless, it is very easily propagated and attains a height of seven or nine feet. Unlike Ocotillo and many other gum-bearing plants, the rubber in these two varieties of cactus occurs as a latex and yields a sticky, white liquid from the abraded surface if pressure be applied by the fingers. By special treatment of the latex and subsequent refining, an amber colored gum resembling smoked sheet in color and guayule in physical properties is obtained, although the gum when thoroughly dried is considerably less plastic than guayule. It is reported that the gum can be produced at a price to compete favorably with guayule and crude rubber.

Following is a summary of some of the experiments made with gum from the spineless cactus:

SAMPLE 1.

	Per Cent.
Smoked sheet rubber	50
Cactus rubber	40
Compound (mineral ingredients)	10

This compound was mixed upon the mill in the usual manner and contained only the amount of sulphur usually required to vulcanize a stock having 90 per cent smoked sheet. It mixed easily on the rolls at a much lower temperature than that which would have been required for pure smoked sheet. The next day test strips were cured in the press and were found to have high tensile strength and elasticity, showing that the gum vulcanizes perfectly in about the same length of time required for plantation rubbers. Another portion was used to friction a sample of belting duck which was found upon examination to be thoroughly impregnated with the gum. A very tacky cement was made from the remaining portion by dissolving in benzol.

SAMPLE 2.

	Per Cent.
Smoked sheet	20
Auto reclaim	20
Cactus rubber	20
Compound	40

In spite of the fact that this stock was mixed on a relatively cold mill, it retained a sticky surface after calendering and showed no tendency to bloom in the raw state. It would seem from this that the use of the gum in repair stocks and especially in those containing large amounts of carbon black would be advantageous, due to the necessity of preserving a tacky surface indefinitely, and the lower temperature at which the stock could be milled would minimize the danger of burning when use is made of certain organic accelerators. Part of Sample 2 was used to skim-coat and cover the fabric mentioned above, which was then made into a piece of belting.

SAMPLE 3.

	Per Cent.
Smoked sheet	10
Auto reclaim	20
Cactus rubber	17
Compound	53

It was the object of this mixture to estimate the value of the gum in a cheaper compound containing a larger percentage of minerals. No difficulty was encountered in milling and the stock was made into various kinds of articles of comparatively good quality.

SAMPLE 4.

	Per Cent.
Cactus rubber	10
Reclaimed	60
Compound	30

This was a regular heel compound in which 10 per cent smoked

sheet would ordinarily have been used. The smoked sheet was replaced entirely with the cactus rubber without reducing the quality of the heels so far as could be determined. It is interesting to note that the reclaimed rubber used in this case would not stick to the rolls and could not be milled until about two pounds of the cactus rubber was added, when it immediately began to spread out evenly over the roll and continued to adhere thereto until the milling was completed. A number of rubber heels were made from this stock, all of which appeared to be of good quality.

It is the opinion of the writer, as well as of others who assisted in the experiments, that the gum is in every way equal to guayule and in some respects superior, among which may be mentioned the readiness with which it vulcanizes and the extent to which it will actually replace crude rubber without an apparent reduction in the quality of the finished product. This would evidently place it in a class with crude rubber itself. For use in frictions where penetrating qualities are necessary the gum possesses this property to a marked degree.

The results of these experiments indicate that it may be only a question of time until America may have a new and important industry—the production of rubber from her deserts and waste lands. Los Angeles is already the cynosure of the eyes of the rubber world as the nucleus of a new and rapidly growing rubber manufacturing center. The production of long-staple cotton of highest quality in Southern California has quickly sprung from infancy to a well recognized commercial success and if the cactus rubber possibilities materialize, the United States and even California will be able to produce a complete tire from her own raw materials.

Old and New Methods in Cotton Warehousing and Financing.

By Richard Hoadley Tingley.

"THE FINANCING of a cotton crop is one of the most difficult, and at the same time one of the most important problems confronting the southern farmer and business man." This is quoted from an address made in 1915, by R. L. Nixon, specialist in warehousing of the Bureau of Markets, Department of Agriculture. At that time cotton was worth approximately ten cents a pound and the South was suffering from a disruption of trade caused by the war. With prices practically four times those of 1915, the difficulty and importance of the problems become intensified in proportion.

A COTTON CROP WORTH TWO AND A QUARTER BILLION DOLLARS.

It is a recognized fact that but little cotton would be stored or insured were it not necessary to do so in order to negotiate loans with cotton as collateral. Banks have always been willing to advance money on cotton on liberal terms when properly warehoused and insured up to the limit of their capacity but, with a cotton crop worth $750,000,000, as it was in 1915, and a crop valued at $2,250,000,000 as is this year—and all of it credit cotton at one stage or another, and sometimes oftener than at one stage—the problem assumes gigantic proportions. Such enormous sums, of necessity, take it out of the hands of the comparatively small coterie of southern and northern banks that heretofore found little difficulty in handling the business, and call for nation-wide bank participation—a participation made possible by the provisions of the Federal Reserve Banking Act.

LACK OF UNIFORMITY IN WAREHOUSE LAWS AND RECEIPTS.

There are many stumbling blocks in the way of a nation-wide participation in cotton financing, many of which will have to be removed before cotton credits can be placed on a liquid footing commensurate with the importance of the business. In the first place, except in the cities of the Cotton Belt and the large commercial centers of the North and East, the banks do not understand cotton paper, it has been outside the line of their activities, and in the second place, the warehousing laws of the country are by no means standardized. Practically every state has its own laws regulating warehouse operations, which differ, often in essential features, from those of other states. It cannot be expected that a national bank officer in, say, Minneapolis is familiar with all of these laws. To keep himself informed, would be an undertaking for which he has not the time. Cotton paper, based on warehouse receipts for goods in store at, say, Atlantic, Georgia, does not interest him.

IDEAL FIRE-PROOF TYPE OF CONCRETE WAREHOUSE CONSTRUCTION.

INTERIOR OF A HOUSTON, TEXAS, COTTON WAREHOUSE, PROTECTED AGAINST FIRE BY AUTOMATIC SPRINKLERS.

In the third place, there is a woeful lack of uniformity in the receipts given for goods in store issued by warehousemen in different sections of the country. There is no standardized practice in this respect and, in consequence, cotton paper to which is attached a receipt for the cotton stored in a warehouse in, say, Houston, Texas, is not interesting to a banker of Norfolk, Virginia. He not only does not understand the Texas laws that regulate and prescribe the form of receipt but he does not

know the warehouseman at Houston, and cannot take the trouble to investigate his responsibility.

COTTON WAREHOUSES OWNED BY BORROWERS.

It is a well-known fact that practically every cotton warehouse in the South is owned, either directly or indirectly, by the cotton factors and merchants of the locality. Few of these have ever been operated as independent business enterprises, but rather as adjuncts to the chief business of their owners—trading in cotton. Another disturbing factor in cotton financing, as it has been conducted in the past, is this fact of ownership. A cotton merchant in, say, Savannah, Georgia, has bought 100 bales of cotton which he proposes to hold for a future sale. He stores the goods with the X. Y. Z. Warehouse Company in which he is a large owner and possibly an officer or director. The receipt given him for the cotton so stored he takes to his local bank and negotiates a loan with it as collateral. The local bank officer knows perfectly well that he is a large owner in the warehouse and that, in loaning him money with this receipt as collateral he is leaving the cotton practically in the hands of the borrower instead of in the hands of an outside independent corporation——as is the theory of warehousing. Loans so made are therefore based more on the personal standing and integrity of the borrower than on the cotton represented by the receipt which he offers. The bank knows perfectly well that owing to his ownership and control he can take the cotton out of store and sell it and the bank will be none the wiser until afterwards.

Much the same condition obtains in the New England mill centers. There are few public cotton warehouses in the North and cotton is usually stored in the mill yards. Whatever loans are made by local banks with this cotton as collateral are based on the personal standing of the borrower rather than on the merchandize itself, for the New England banker knows well that the cotton for which he holds receipt is out of his jurisdiction and the technical fact that he holds a receipt for it, which he has taken as collateral security, cannot prevent the mill owner from using the cotton and he will be none the wiser until afterwards.

COTTON FINANCING—PRESENT PRACTICES.

I will illustrate further the system that has grown up as a precedent, of financing a cotton crop—a system that has grown obsolete with the advance of time and in the price of cotton, and demands revision, for it now requires more money to finance the cotton crop than any other of the principal crops raised in the United States.

Following the beginning of the crop movement, around September first, demand for funds is made upon local banks by the interior farming districts. These banks, in turn, call upon the large banking institutions in the cities. The first calls are usually for funds to pay for labor employed in picking and harvesting the crop, and for incidental expenses. Small farmers have usually been financed by the local storekeeper from the time of planting to the time of harvesting, but this merely shifts the burden of the bank from the farmer to the storekeeper.

The cotton factors are also dependent upon the local bank for financing their purchases and for their assistance in carrying the farmers. As a result the local bank may find its credit pretty well extended by the time the crop begins to move.

Financing the factors or cotton brokers is the next step. Bankers in the town where the cotton gins are located arrange for payment for the cotton sold by the factors, by furnishing cash tickets issued to the buyers. These tickets the banks hold as collateral. When sufficient cotton has accumulated to permit making a shipment, the local banker delivers the tickets to the agent of the railroad in his town and receives a bill of lading covering the shipment to a compress point.

After arrival of the cotton at the concentration points comes the demand of the mills and exporters. These demands begin in October and continue throughout the winter. From the time the cotton is picked until it has been converted into a manufactured product fully six months must elapse.

This old method of financing, which is based on single name paper with the staple as collateral, is giving way to the use of trade and bankers' acceptances, and the advantages resulting from such a system have been made possible by the provisions of the Federal Reserve Act.

To illustrate (I quote from John Bolinger of the Shawmut National Bank, Boston): "A Boston cotton broker purchases cotton to the value of $50,000 from a dealer in Galveston. As the Galveston man wants immediate payment for the staple, the buyer arranges with his bank in Boston for an acceptance credit for ninety days. The Boston bank notifies the Galveston cotton dealer that it will 'accept' his draft drawn at ninety days' sight, for $50,000, provided bills of lading and other documents are attached to the draft when presented. The Galveston dealer then delivers the cotton to a transportation company and secures a bill of lading for the shipment, which he attaches with invoice and other documents to a draft on the Boston bank. Taking this draft and documents to his own bank at Galveston he discounts it and receives payment for his cotton. The draft and documents are then forwarded to Boston by the Galveston bank for 'acceptance.' After acceptance the draft is returned to the Galveston bank, or may be sold in the open market and the amount placed to credit of its account. The Boston bank retains title to the cotton until its customer provides for the payment of the draft through resale of the cotton."

All of the above is based upon the fact of the warehousing of cotton under conditions now existing.

STANDARDIZED WAREHOUSES RECOMMENDED.

But let us inject a new feature into the transaction, namely, a standardized chain of cotton warehouses covering all important concentration centers of the South and consumption centers of the North, owned by one company and operated as a business proposition. The idea of such an organization has long been the dream of almost every one connected with cotton, no matter from what angle—and it goes without saying that every bank in the land would welcome it.

Such an organization should place itself in so strong a position financially that every bank in the country would recognize it at sight as being sound, dependable, and independent of the "trade." It should provide itself with a form of warehouse receipt that will be recognized as universal the country over so that a banker in, say, Cleveland, Ohio, or Bangor, Maine, will be as familiar with it as he is with the universal form of railroad bill-of-lading that now passes current the country over.

THE UNITED STATES WAREHOUSE ACT OF 1916.

Recognizing the need of innovation in cotton warehousing and in order to provide the machinery necessary for its accomplishment, Congress passed in August, 1916, the United States Warehouse Act. Amended in July, 1919, this act now offers to prospective warehousemen as well as to those already engaged in the business, an opportunity for standardizing their operations under the supervision of Uncle Sam and his Department of Agriculture, and many companies are already availing themselves of the provisions and privileges so offered.

There is nothing compulsory contained in the Act, but it provides for a permissive system of warehouses licensed by and bonded to the United States Government and operated under a system of government inspection and supervision. The Act also provides for the licensing of competent weighers and graders upon application.

The purpose of the Warehouse Act is to create a warehouse receipt of unquestioned value, and one which will be acceptable to all bankers as security for obtaining loans, regardless of the location of the warehouse. In this way, warehousemen will furnish a receipt to their customers which will be of the ut-

most value to them as a negotiable paper, and enable them to borrow close to the actual value of their stored goods at cheaper interest rates. Thus they market their cotton slowly and in conformity with the needs of the manufacturers. The full description of the cotton stored required to be stated on the face of the receipt will enable the owner to know the value of his cotton and enable him to market it intelligently. The proper development of the warehouse will make possible the practice of marketing the cotton crop through the warehouse, and thus avoid the enormous losses resulting from weather damage.

FINANCING UNDER STANDARDIZED WAREHOUSING METHOD.

It will readily be seen that important advantage will accrue to the cotton trade as a whole by the formation of a large operating company, independently owned and controlled, conducting business under the provisions of the United States Warehouse Act with its amendments.

Let us go back to the Galveston dealer and his $50,000 sale to the Boston cotton broker and see how it would operate under

WEIGHING COTTON BALES AT WAREHOUSE PLATFORM.

the system herein described. The Boston broker could arrange for the storage of his purchase in the bonded warehouse at Galveston; he might move it to port at Savannah or Charleston and store it in a similar bonded warehouse; he might move it to New York, Providence, or New Bedford, and in each of these places he could lodge his cotton under the supervision of Uncle Sam whose receipt would satisfy any banker in the land in Boston, Minneapolis, Omaha, or Portland, Maine. Furthermore, if all of these warehouses were centrally owned and operated in chain, one receipt and one insurance policy would cover his cotton, no matter in which warehouse it was stored or while in transit from one house to another.

PROGRESS OF THE STANDARDIZED WAREHOUSE IDEA.

Emphasized by war experiences and the difficulties and uncertainties of transportation, and by the high price of cotton, cotton men of both the South and North have come together in an endeavor to standardize cotton warehousing and warehouse receipts, by the formation of a big corporation for the purpose. It is likely that some 80 or 100 "going" properties will come into the combination that will cover practically the entire field from Massachusetts Bay to Galveston. The National Association of Cotton Manufacturers endorses it. So does the Federal Reserve Board, for it sees in such a move a warehouse receipt issued by a warehouseman who is not interested in the ownership of the goods involved.

The World Cotton Conference held in New Orleans last October, composed of cotton men from all over the world and from every angle of the business, unanimously endorsed the plan by passing suitable resolutions to that effect.

A DISCOUNT CORPORATION TO HANDLE COTTON PAPER.

It is evident that cotton warehousing and cotton financing go hand in hand; indeed the two phases of the industry cannot well be separated. In order to furnish a broad market for the vast volume of cotton paper that will be created by putting into practice the innovations I have described, a discount corporation will be formed as an adjunct to the warehousing feature.

Under this dual system, several notable things will be accomplished, making for both improved conditions in the cotton trade and the stabilization of cotton prices. The smaller farmer will be benefited by being able to carry his cotton over a period of depressed prices. The grower or shipper, when storing cotton in a bonded warehouse under government control, would obtain a receipt which would be excellent collateral in case it was desired to hold the cotton for a better market. Such a receipt, being negotiable and guaranteeing the weight, could be converted into cash at any time or in any place. Spot cotton could be dealt in between persons entirely unknown to each other and rejections would cease. The southern producer would have everything to gain and nothing to lose by the proposal. The spinner would likewise benefit by the guaranty, but his chief gain would be the large supplies of cotton assembled at concentration points, thus insuring him against a scarcity of raw material, due to winter transportation difficulties and other obstacles. Last but not least, bankers would be supplied with a large amount of the most liquid and highest grade paper-acceptance on cotton.

SEPTEMBER MEETING OF THE RUBBER DIVISION OF THE AMERICAN CHEMICAL SOCIETY

The next meeting of the American Chemical Society will be held in Chicago, Illinois, September 7-10, when there will be a meeting of the Rubber Division.

At the spring meeting the question of trade names for accelerators and compounding ingredients was discussed. It was pointed out that thiocarbanilide was offered on the market under no less than six different names. There are accelerators offered which consist of a certain percentage of some common accelerator, the remainder being a cheap filling ingredient. One of the most notable examples of this type is a mixture of starch and alkali, which is now offered for sale under a trade name at a price which is out of all proportion to its cost. Similar conditions exist to a lesser degree in the market for compounding ingredients.

The Division wishes publicly to announce its stand in the matter, which is the reflection of the opinions of the members present at the last meeting. As a body organized for the advancement of the industry, it does not object to the proper use of a trade name for a product. By proper use, it says that it may be more convenient for the general public to use a trade name rather than a long chemical term. It includes under proper use the fact that the manufacturer shall willingly inform the users of his material what the constituents are which he offers in his product.

It must strenuously objects to the marketing of unknown products which are sold under trade names and whose true constituents are supposed to be kept secret. This objection is twofold: it feels that the advancement of the industry is retarded by the use of unknown materials, and also that the public becomes the "goat" by the indiscreet use of unknown accelerators.

In order that the members of the Division may have as full information as possible, it invites statements which have to deal with the subject matter presented, from manufacturers or jobbers of materials which are sold under trade names. The statements made concerning these products may be made publicly or to the Secretary of the Rubber Division.

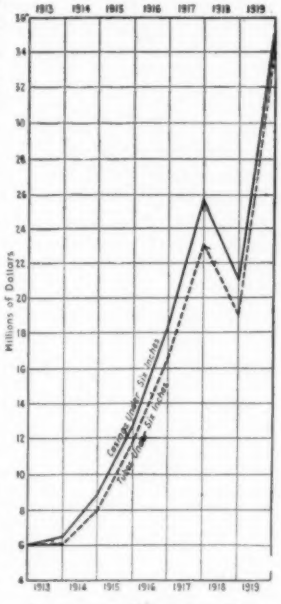
The Division also invites all of its members and other rubber chemists to submit results of their analyses of these materials to the Secretary of the Division so that these various analyses may be filed for reference of the members.

THE "TUF" INNER TUBE, IT IS CLAIMED, WILL NOT CRACK, CHECK, or craze, and will offer good resistance to heat and friction because "made just a little better than seems necessary." (Plexus Tire & Rubber Co., Tacony, Pennsylvania.)

Tire Production in the United States.

STATISTICS recently published by the National Automobile Chamber of Commerce, Inc., together with those gathered and prepared by THE INDIA RUBBER WORLD, show the complete resumption of the growth of the rubber tire industry following the check placed upon its normal development by the Government after the United States joined in the world war.

That the phenomenal growth of the American tire output is due chiefly to the enormous and steadily increasing use of the automobile for both business and pleasure in the United States is indicated by the motor vehicle registration for recent years and the fact that only about 2 per cent of the tire product is being exported. The United States consumes practically all the tires it makes.



PNEUMATIC TIRE AND TUBE PRODUCTION.

AMERICAN MOTOR VEHICLE REGISTRATION.

Year...	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Cars...	1,254,971	1,711,339	2,445,664	3,512,996	4,983,340	6,146,617	7,565,446

Assuming five tires per car as the average annual consumption in 1913 and four and one-half tires per car the present consumption, owing to the wider use and longer life of cord tires, the American demand for tires has grown from about 6,275,000 in 1913, to over 34,000,000 in 1919, or nearly five and one-half times that of 1913.

AMERICAN TIRE AND TUBE PRODUCTION.

During the past seven years the American tire and tube production, actual and estimated, has been as follows:

Year	1913.	1914.	1915.	1916.	1917.	1918	1919.
Casings under 6 inches	*6,588,000	*8,983,000	*12,840,000	18,564,957	25,840,656	*21,000,000	*35,000,000
Tubes under 6 inches	.....	.....	.....	16,785,398	23,256,752	*19,000,000	*34,500,000

*Estimated

It will be seen that the figures for 1917, the last year prior to government curtailment of tire production, show an increase to nearly four times the output for 1913. Although production in 1918 was curtailed to about 85 per cent of the 1917 output, the 1919 production showed an increase over 1917 of 23 per cent in casings and 48 per cent in tubes. At an average of $30 per tire the value of the 1919 product of casings under six inches was about $1,050,000,000, to which may be added $172,500,000 for the tube production at an average of $5 per tube, making a total of $1,222,500,000 for the pneumatic tire output of 1919, exclusive of giant cord tires for heavy trucks.

AMERICAN CRUDE RUBBER CONSUMPTION FOR TIRES.

For the manufacture of the tires and tubes mentioned above the consumption of crude rubber was as follows:

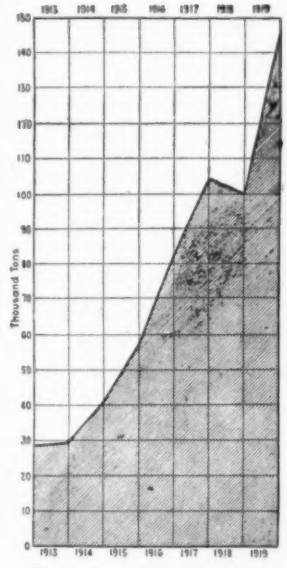
	1917.	1918.*	1919.*
Casings under 6 inches,....*pounds*	162,643,482	150,000,000	225,000,000
Tubes under 6 inches.....	35,704,446	35,000,000	48,000,000
Solid tires	25,055,673	48,000,000	40,000,000
Other tires and sundries.....	9,983,195	15,000,000	12,000,000
Totals	233,386,796	248,000,000	325,000,000

*Estimated.
Only the estimated total weights are available for the years 1913-1916. They are in pounds: 1913, 65,880,000; 1914, 89,830,000; 1915, 128,400,000; 1916, 185,649,570.

In 1919 approximately 60 per cent of the india rubber consumed in the United States was used for tires and tire sundries as against 75 per cent in 1917 and only 58 per cent of the imports for the fiscal year 1913, indicating the greater supply of the raw material. The actual quantity of crude rubber used in 1919, however, was almost five times that for the year 1913, as against about three and one-half times that for the year 1917.

AMERICAN TIRE DEMAND FOR ORIGINAL EQUIPMENT.

Statistics of motor vehicle production in the United States indicate the increasing number of pneumatic and solid tires required annually for original equipment.



CRUDE RUBBER CONSUMED IN TIRES AND TUBES.

MOTOR VEHICLE PRODUCTION.

Year.	Passenger Cars.	Motor Trucks.	Totals.
1913.....	461,500	23,500	485,000
1914.....	543,679	25,375	569,045
1915.....	818,618	74,000	892,618
1916.....	1,493,617	90,000	1,583,617
1917.....	1,740,792	128,157	1,868,947
1918.....	926,388	227,250	1,153,637
1919.....	1,657,652	316,364	1,974,016

Only a cursory inspection of these figures is necessary to see how the production of passenger cars and correspondingly of pneumatic tires under six inches was curtailed by the war situation of 1918, and the production of trucks and truck tires stimulated. Truck tire production for original equipment showed continuous growth during the war period. In 1918 it had increased to over 9½ times the 1913 production for this purpose and in 1919 to nearly 13½ times the 1913 production. Pneumatic tire production for the original equipment of passenger cars reached its highest figure for the year 1917, when it was more than 3¾ times the 1913 output. This volume of business was not quite reached in 1919, but the output for original equipment that year was more than 3½ times the 1913 production for this purpose. It is seen, therefore, that while 1,940,000 tires sufficed for new equipment in 1913, no less than 7,475,888 were required in 1917, and 7,896,064 in 1919, an increase to over four times the 1913 requirements. Although the greater volume of increase has been in pneumatic tires under 6 inches, the greater rate of increase has been in solid and large pneumatic tires for trucks.

TIRES IN USE IN THE UNITED STATES.

Of the 7,565,446 motor vehicles registered in the United States during the calendar year 1919, some 750,000 were trucks, so that about 8¼ times as many pneumatic tires under 6 inches as truck tires were in use last year, the number of each sort, exclusive of spares and replacements, being approximately 27,235,392 pneumatics under six inches and 3,000,000 truck tires. One additional tire per car would be a conservative estimate for spares and

replacements, making the totals, 34,044,240 pneumatics and 3,750,000 truck tires. With nearly 38,000,000 motor vehicle tires in use it is not surprising that some 25,000 vulcanizers are kept busy with repairs and retreading.

On the basis of 20 pounds of rubber average per car for regular equipment, and one-fourth of that extra for one spare per car, 170,221,200 pounds of rubber were being used last year in American tire casings under six inches alone, an amount almost equal to the total india rubber imports of the United States for the fiscal year ended June 30, 1915, and equal to nearly 32 per cent of the United States india rubber imports for the calendar year 1919.

UNITED STATES TIRE EXPORTS.

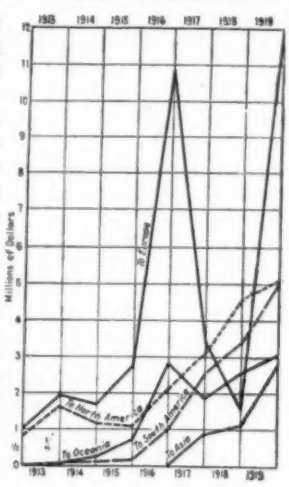
Export business has become a considerable part of the American motor tire business as shown by the following statistics compiled by the Bureau of Foreign and Domestic Commerce.

A study of these figures reveals several facts of interest, notably the remarkable growth of tire exports to South America, Asia, and Oceania. The combined value of the 1919 business in these three divisions was over 35 times the value of these exports in 1913. Exports to Oceania fell off in 1917, but the following year had nearly reached the high mark of 1916. North American exports were adversely affected in 1914 and 1915, but thereafter steadily grew until in 1919 they had increased to over $5,000,000 in value.

The South American trade has maintained a continuous and remarkable growth throughout the seven years under consideration, the value of the 1919 exports being nearly 50 times that of 1913. Exports to Africa grew steadily until 1918, when their value reached some 42 times that of 1913, but showed a falling off of about 7¾ per cent for the calendar year 1919 as compared with the fiscal year 1918.

European exports have fluctuated greatly owing to the war. In 1914 they decreased a little, but increased considerably in 1915 and in 1916 jumped to more than five times their value in 1913, after which they declined steadily, the value of the 1918 shipments being only about 74 per cent of the 1913 value. The 1919 exports, however, exceeded the banner year 1916 by more than 8 per cent, showing an increase to more than 6 times the 1913 value.

Total tire exports to all countries likewise fell off in 1914, but gained in 1915, jumped during 1916 to about 4¼ times as much as in 1913, dropped considerably in 1917, but showed a noticeable gain in 1918 and a gain of about 55 per cent in 1919. Automobile tire exports for the calendar year 1919 amounted to more than double the value for the fiscal year 1917. It may be said, therefore, that despite the fluctuations of 1914 to 1917 inclusive, American automobile tire exports have shown a great and steady growth, the value of the foreign business in 1919 having increased to almost seven times what it was in 1913.

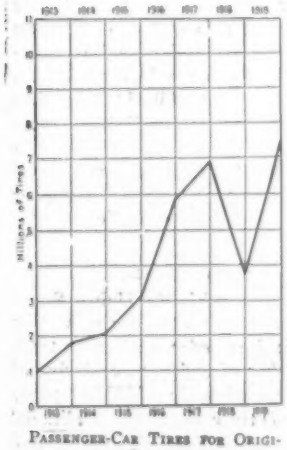


UNITED STATES AUTOMOBILE TIRE EXPORTS.

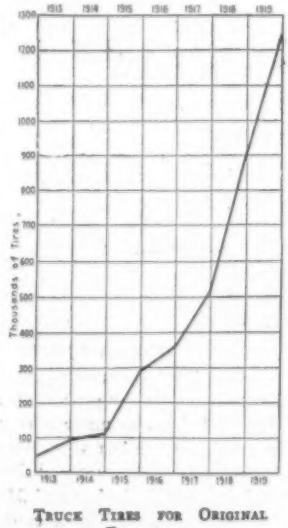
AUTOMOBILE TIRE EXPORTS.

Exported to:	1913.*	1914.*	1915.*	1916.*	1917.*	1918.*	1919.†
Europe	$1,977,029	$1,764,240	$2,745,450	$10,992,184	$3,480,114	$1,460,518	$11,907,480
North America	1,626,155	1,254,200	1,187,632	2,184,874	3,186,265	4,474,713	5,188,317
South America	100,065	115,387	214,068	1,050,398	2,596,936	3,432,181	4,986,024
Asia	36,212	64,173	73,430	477,895	810,300	1,194,551	2,970,464
Oceania	185,807	279,327	702,877	2,996,401	1,832,244	2,662,422	3,177,431
Africa	17,952	27,940	39,813	334,475	424,342	753,286	694,943
Totals	$3,943,220	$3,505,267	$4,963,270	$17,936,227	$12,330,201	$13,977,671	$28,924,659

*Fiscal years.
†Calendar year.



PASSENGER-CAR TIRES FOR ORIGINAL EQUIPMENT.



TRUCK TIRES FOR ORIGINAL EQUIPMENT.

TWO NEW VULCANIZATION ACCELERATORS.

A vulcanization accelerator for which many advantages are claimed bears the trade name of "Vul-Ko-Cene." It has been demonstrated in practical work to be remarkably efficient. There is said to be more "kick" in one pound of vulkocene than in three pounds of any other accelerator and it is non-poisonous and prevents blooming.

A vulcanization accelerator of French manufacture is known as "Vulcazol." The makers claim that it is non-poisonous and requires no special precautions in its use. Only one-half to one per cent on the weight of the rubber is required and the time of vulcanization may be reduced from 80 to 85 per cent and a lower temperature be employed. It also prevents blooming by forming a stable combination with the excess of sulphur employed in the mixing.

ACCELERATORS UNDER LICENSE.

The right to use hexamethylene-tetramine, aldehyde ammonia, aldehyde derivatives and other chemical substances as promoters of vulcanization and improvers of vulcanized products, covered by United States patents Nos. 1,126,469 (January 26, 1915) and 1,149,580 (August 10, 1915), granted to Hoffman and Gottlob, is now controlled by the Grasselli Chemical Co., Cleveland, Ohio, to whom the patents have been assigned. The right to sell or use any of the substances coming within the scope of the patents in the manufacture of vulcanized rubber is said to be limited to their licenses.

"THE COMMERCIAL TYPE" FABRIC TIRE TO FIT 30 BY 3½ RIMS IS the most recent announcement of the production department of The Miller Rubber Co., Akron, Ohio. The new tire has been designed to take care of the added weight incident to commercial vehicles. In the past, it has been customary to use either a 30 by 3½ cord or a size larger fabric tire.

Methods for Physical Testing of Vulcanized Rubber Goods.[1]

SAMPLNG.

(1) SAMPLES shall be taken directly from the finished material. These should be sealed, and marked with maker's name, date of sampling, kind of material and sufficient other data to insure easy and complete identification. The sample should be of such size as to permit of part being taken for test and the remainder stored for future reference, should the occasion arise. Every precaution must be taken to prevent contamination of the sample by any foreign material, and it must always be stored in a cool place. The object of these precautions is to insure that the sample shall be received in exactly the same condition as it was when taken from the original lot.

(2) In general, the following shall represent the amount of sample required for test:

(a) Tires, tubes, etc., of all kinds. One to be selected at random from each lot of 500 or less.

(b) Hose. Three lengths from each lot of 5,000 feet or less. A 3-foot section to be cut from each length selected, for bursting tests; other tests to be made on the remainder of the same sample.

(c) Belting. One sample 12 inches long from each roll of belting under 6 inches in width and 6 inches long from belting over 6 inches in width.

(d) Packing. One sample 10 inches long cut across the full width of the sheet from every lot of 250 pounds or less.

(e) Molded and lathe cut goods. One piece selected at random from every 200 pieces or less.

PREPARATION OF TEST PIECES.

(1) For tensile, elongation and set, strips shall be cut 175 mm. long by 25 mm. wide by approximately 2 mm. thick. In every possible case these strips should be cut from the sample. In cases where the sample consists of a large block, as for instance, a section of a solid tire, the strips may be obtained by using heavy meat-slicing machine. When the material is made up with layers of fabric, as in the case of rubber hose, the first step in preparing specimens for the tension test is to separate the rubber from the fabric. Unless the frictioning is very poor, this will necessitate the use of a solvent. If there is more than one layer of fabric the easiest way is to remove the first layer along with the rubber. The rubber is then separated from the adjoining layer of fabric, using C. P. benzol blown from a wash-bottle. Narrow strips are more easily handled than larger pieces, and there is less danger of injuring the rubber. Great pains should be taken during this operation because any flaw or local imperfection will seriously vitiate the results. The rubber should be allowed to rest for four hours, in order that it may recover from the stretching it has received and that the benzol may thoroughly evaporate.

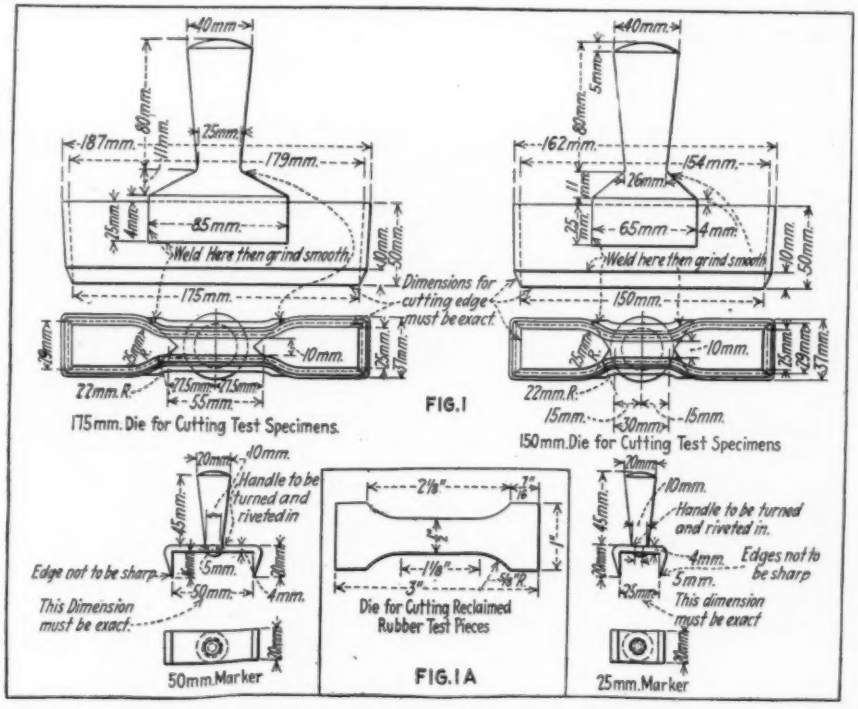


FIG. 1. STANDARD DIES FOR CUTTING AND GAGING TEST PIECES. FIG. 1-A. STANDARD DIE FOR CUTTING SAMPLES OF VULCANIZED RECLAIMED RUBBER.

(2) Wherever possible test strips should be cut in the transverse direction. In case tests are desired in the longitudinal direction, they should also include the transverse. Directions should be recorded with the results of the tests.

(3) In case the articles to be tested will not permit of pieces as above taken, then small sample pieces shall accompany each lot. These may be cured in the form of sheets approximately 2 mm. thick and of such shape as to give the desired length and number of strips, provided further that they shall be guaranteed by the manufacturer to represent truly the average composition and cure of the article delivered. From the piece described above, test pieces shall be cut using for this purpose the standard dies shown in Fig. 1, except with samples of vulcanized reclaimed rubber for which the die Fig. 1-A shall be used. The cutting edge of the die shall be kept sharp and the test pieces may be cut best by striking the die a quick heavy stroke with a mallet, in which case the die should be provided with a handle, or it may be done by attaching the die to the rack of an arbor press, Fig. 2. The piece should be cut against a backing of fine cardboard, hard rubber or leather. The backing or cloth impression shall be removed from the test piece by buffing. Where test pieces are cut from strips of uneven thickness, they shall be buffed to a uniform thickness for about 8 cm. over the middle portion of the strips, after which the test pieces are cut with the die.

(4) For stocks having high elongation such as pure gum, a shorter die giving only 25 mm. constricted portion should be used.

[1] Report of Committee of the Rubber Division on Physical Testing. Published by courtesy of the American Chemical Society. Paper read before the Rubber Division of the American Chemical Society, at St. Louis, Missouri, April 14-15, 1920.

(5) Buffing: It is recommended that for buffing test pieces, the wheel shown in Fig. 3 be used. The wheel is operated with a ⅛-h.-p. motor. The rubber to be buffed is clamped to a carriage which is moved back and forth under the 5 by 1-inch emery wheel (No. 60) running at about 3,000 revolutions per minute. The central portion of the carriage just under the rubber is slightly raised, by which means it has been found that the operation is more easily performed and with less danger of injury to the rubber. The wheel has a vertical adjustment and a thumb-screw serves to lower the wheel by very small amounts as the buffing proceeds. Shields are provided for the purpose of keeping the fine particles of rubber off the guide. The starting base, though not necessary, is desirable in bringing the wheel gradually up to the maximum speed.

(6) Measuring Width and Thickness: A micrometer of the rack and pinion and dial micrometer type, Fig. 4, shall be used, using a known weight (225 grams), namely, just enough to actuate positively the rack and pinion and bring the disk positively on the face of the test piece without compressing the rubber. The shoe and base which presses against the rubber shall be 1 cm. in diameter.

(7) In case of asbestos packing, which is very stiff, it is necessary to use a greater weight to obtain the correct thickness: 3 kg. on the foot 1 cm. diameter should be used.

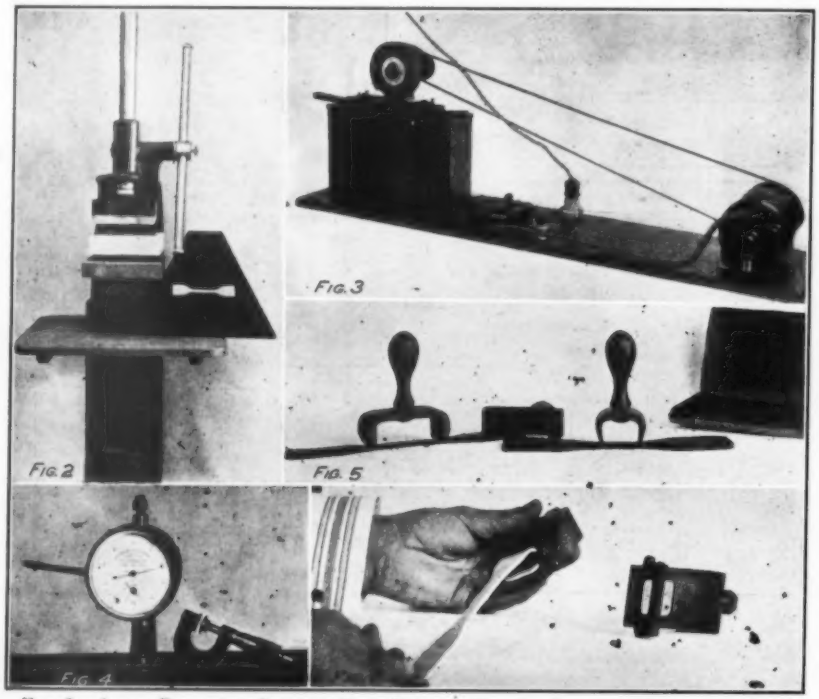


FIG. 2. ARBOR PRESS FOR CUTTING TEST PIECES. FIG. 3. BUFFING WHEEL AND ELECTRIC DRIVE. FIG. 4. DIAL AND HAND MICROMETER. FIG. 5. GAGE MARKER (SEE FIG. 1 FOR DETAILS OF CONSTRUCTION). FIG. 6. SPECIAL JAWS FOR PURE GUM TESTS.

(8) Before any tests are made, the width and thickness shall be determined by taking several readings on the constricted portion of the specimen. The cross-sectional area shall then be determined on the basis of the readings which show the smallest cross section.

(9) Conditions for Making Tests: All tests of the rubber parts shall be made in a room the temperature of which is between 15 and 35 degrees C. The tests shall not be made until the test pieces have stood long enough to attain room temperature (not less than 4 hours). In case it should be impossible to perform the tests in room temperature within the limit of 15 degrees and 35 degrees C., a box or conditioning chamber is provided which can be kept uniformly at 24 degrees C., in which the pieces should be placed before testing, for a period of 4 hours, and the test performed immediately after removal from the chamber.

(10) Aging after Curing Before Testing: The slabs from which the strips are cut shall have been cured at least 24 hours before the test is made.

(11) Data on Reclaimed Rubber: The report of tests on vulcanized reclaimed rubber shall be accompanied by a statement in regard to the cure of the slabs from which the test pieces were cut; this statement shall include time and temperature of the curing heat and the amount of sulphur used.

PHYSICAL TESTS.

(1) Tensile: Tensile may be defined as the force required to break a piece of unit cross-section area. It should be expressed in kilograms per square centimeter.

(2) Elongation: This term is used to express the increase in the length of the test piece measured between two marks placed on that portion of the test piece which is of uniform cross section. It should be expressed in per cent.

(3) Set: This term is used to express the increase in the length of the test piece measured between two marks placed on that portion of the test piece which is of uniform cross section, after it has been stretched to 60 per cent of its breaking elongation for three successive times, holding it under this elongation for ten minutes each time, and permitting five-minute intervals of rest between each interval of stetch, and finally allowing it to rest ten minutes before the final measurement is taken. It is measured in per cent, based on the original length.

(4) Gage Marks: The gage marker, Fig. 5, shall be in the form of a stamp having thin steel blades which are strictly parallel and 50 mm. apart; another marker having blades 25 mm. apart shall be used for the high-grade stocks such as pure gum. The blades shall be kept clean and free from accumulation of ink, in order that the lines marked on the test pieces shall be very fine.

(5) Number of Tests: At least four strips shall be tested in every case and the average of these tests taken.

(6) Report of Results: Since the physical properties of rubber vary noticeably in any given product, it may occasionally happen that tests are made upon a test piece which will be of poor quality. The material as a whole meets the requirements of the standard, but the particular piece taken falls somewhat below it. To reject or accept a lot of, say, hose, belting, packing, etc., because of failure of just one test piece to meet the specifications, would, therefore be unfair. For this reason, acceptance or rejection of an item offered for delivery shall be based on the average of at least four determinations for each quantity. In arriving at these averages no weight shall be given to tests which are obviously in error, and do not represent true average conditions; namely, cases in which the tensile strength is low on account of a small flaw in the article. If the tensile strength of

a piece falls more than 10 per cent below the specified amount, it shall not be counted in calculating the average strength, providing that in no case shall more than 25 per cent of the pieces tested be eliminated on this account. In other words, the object of test is to determine the quality of the article as a whole.

(7) Adjusting Test Piece in Grips: The test piece shall be adjusted in the grips, care being taken to insure a uniform distribution of stress over its cross-section.

TESTING MACHINES.

(1) The testing machine shall be power driven and shall meet the following requirements:

(a) It shall indicate and record correctly the applied load, and its accuracy shall be tested from time to time by calibration with dead weights. The tension indicator shall not jump back more than 0.5 per cent when the specimen breaks. A machine

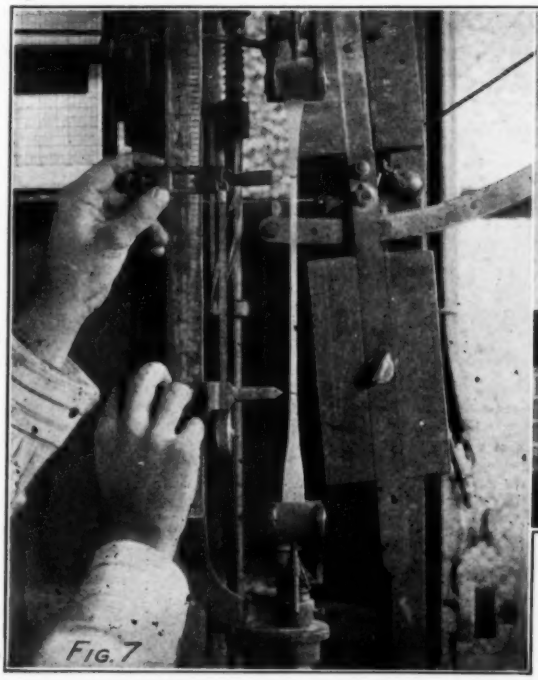


FIG. 7. DEVICE FOR MEASURING ULTIMATE ELONGATION.

for which the load is applied by tension on a spring should not be used.

(b) The grips shall separate at a uniform rate of 50 cm. per minute, except in the case of friction pulls where the rate of separation should be 25 mm. per minute, or for testing hard rubber the rate of separation should be 4 mm. per minute.

(c) The grips shall tighten automatically and exert a pressure proportionate to the applied tension. The grips shall exert a uniform pressure across the width of the test piece regardless of any variation in the thickness of the rubber. If the nature of the rubber is such that the jaws cut it in course of test, namely, pure gum inner tube stocks, a jaw such as shown in Fig. 6 is much more satisfactory.

(d) A device shall be provided for instantly starting and stopping the motion of the movable jaws; also means to enable the operator to return the movable jaws rapidly to their initial position.

(e) Computing results. Tensile, in kilograms per square centimeter equals

$$\frac{B}{W \times T} \times 100$$

B = Tension in kilograms indicated by machine at breaking point.

W = Width of test piece measured to 0.01-mm.

T = Thickness of test piece measured to 0.01-mm.

In other words, the tensile in Kg/cm² is obtained by dividing the breaking load expressed in kilograms by the cross section area of the test piece expressed in square centimeters.

(2) Elongation: The ultimate elongation should be measused with a steel tape graduated to millimeters, attached to trammel points fixed on a rod running parallel with the test piece and so arranged that they slide on this rod (Fig. 7). The trammel points are then always kept even with the marks on the test piece, and after the piece has broken, the scale will record the distance between the marks at the time of breaking. If the initial distance between the marks is 50 mm. and the

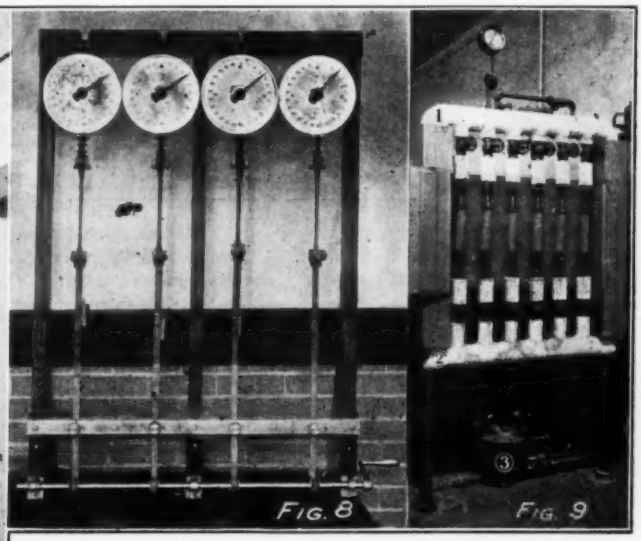


FIG. 8. APPARATUS FOR DETERMINING THE SET.

FIG. 9. PIPE CONNECTIONS FOR STEAM HOSE TEST.

distance between the marks at the breaking point is 150 mm. the per cent elongation will be 150 mm. minus 50 mm., divided by 50 mm. multiplied by 100 equals 200 per cent. Or it may be expressed by

$$\frac{Lf - Lo}{Lo} = 100 = \text{Per cent elongation.}$$

Where Lo equals initial distance between the marks, Lf equals distance between the marks at the breaking point.

(3) Set: For determining the set, the apparatus shown in Fig. 8 shall be used. The test specimens shall be prepared the same as the pieces used for tensile and ultimate elongation tests. Its operation is as follows: The specimens being in the grips, one of the spools is moved along the shaft until it engages the corresponding pin, and the shaft is revolved until the specimen has been stretched to 60 per cent of the breaking elongation measured between gage marks. The clamp is tightened to hold the specimen in this position for 10 minutes. The specimen is then released and allowed to rest under no elongation for five minutes. It is then stretched to 60 per cent as before and held 10 minutes again, then released and allowed to rest another five minutes. Again stretched to 60 per cent as at first, and held a third 10-minute period, after which it is released and after being allowed to rest five minutes, the final measurement of the distance between the two marks is made. The initial distance be-

tween the two marks subtracted from the final distance gives the increase in length or the set and this distance divided by the original length multiplied by 100, expresses the set in percent of the original distance. For example, if the original length is 50 mm., and the final length is 57.5 mm., the set in per cent will be 57.5 minus 50 mm., divided by 50, and multiplied by 100, equals 15 per cent.

(4) Taking of Time: All measurements of time shall be by means of a stop-watch or with a watch having a second hand. The fundamental methods of testing are so made throughout the entire rubber specifications that the following procedure shall be uniform. After placing any test piece in the machine ready for stretching, the piece shall be drawn just taut and the stop-watch started at the instant of the beginning of the stretch.

Then in case a piece is held for 10 minutes at a certain distance, the time shall be again measured at the moment the piece is released. This moment is simultaneously the beginning of the period of rest. The measurement is then to be taken at the instant of the expiration of the second 10 minutes.

(5) When the specification calls for a 1-minute stretch and a 1-minute rest, the time consumed in stretching to the specified elongation shall not exceed 15 seconds.

(6) Initial Tension and Reduction in Tension after a Specified Elongation for a Given Length of Time: For this purpose

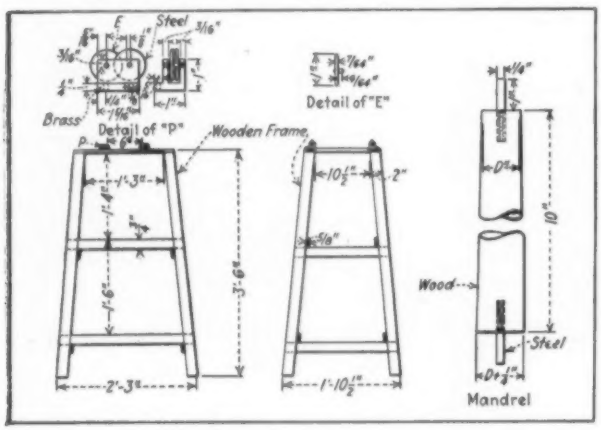


FIG. 10. APPARATUS FOR TESTING FRICTIONS.

the apparatus illustrated in Fig. 8 may be used. Its operation is similar to that of the apparatus shown in Fig. 7. If desired a spring balance may be used in connection with the apparatus shown in Fig. 7.

(7) Friction Adhesion: Definition of Friction: By friction test, is meant the strength of the adhesion of the fabric plies that will meet the test given in the various specifications for adhesion between the fabric plies or between fabric and cover.

(8) Method of Making the Test: A section a little over 25 mm. in width should be cut and raveled down to exactly 25 mm. After starting the separation as previously described under "Preparation of Test Pieces," the ends of the pieces are gripped in the jaw of the testing machine after which separation is affected by running the machine so that the jaws separate at a uniform rate of 25 mm. per minute. The weakest point shall be recorded and the average taken.

(9) In the case of tire frictions and hose frictions it is usually desirable to make a separation between every ply; with belts the usual practice is to make a separation of two plies at a time.

(10) Apparatus and General Method of Conducting Dead Weight Tests.

Friction: A testing frame, Fig. 10, suitable for the purpose shall be used. This may consist of a wooden frame provided with roller bearings at the top in which a mandrel is free to revolve. The total weight including the clamp suspended from the test piece, shall be equal to that called for in the specifications.

(11) A movable platform should be provided for supporting the weight while adjustments for the tests are being made. The arrangement should be such that the platform may be gradually lowered until the weight is carried by the test piece, after which it should be dropped or swung to the side. In every case this operation should be accomplished without a jerk. With the weight hanging freely from the test piece a mark shall be made along the line of separation of the layers, and at the same instant the time shall be noted for the beginning of the test. At the end of 10 minutes, or as great a part thereof as possible, a second mark shall be made along the line of separation. The distance between the marks, measured after the weight has been removed, shall be used in computing the rate of separation.

(12) Plied Hose: In preparing test pieces, a short length of hose is pressed tightly over a slightly tapered mandrel. The mandrel is put in a lathe and 25-mm. rings are cut with a pointed knife. Beginning at the lap a short length of the fabric is separated and the ring is pressed snugly over a mandrel which is placed in the roller bearings on the test table. To the detached end of the fabric is fastened a clamp provided with a hook or ring from which the weight is to be supported.

(13) Cotton Rubber-Lined Hose: In preparing a sample of cotton rubber-lined hose, a 5-cm. section shall be taken and cut at the lap to give a strip equal in length to the circumference of the hose. From this section a 40-mm. strip shall be cut with as little injury as possible to the cotton jacket. The jacket shall be separated from the lining for about 40 mm. at one end. The detached end of the jacket is held in a stationary clamp which is supported by the testing frame and the specified weight is suspended from the rubber lining.

(14) Rubber Belting: When testing rubber belting, a 25-mm. strip cut either longitudinally or transversely, shall be used. The strip shall consist of two plies of fabric only, these plies to be the second and third plies of the belt, numbering from the top cover or from the bottom cover, as may be desired.

(15) Packing and Gasket Material: When testing packing or gasket material, the pieces shall be prepared and tested as in the case of cotton rubber-lined hose, unless the thickness of rubber is greater than 27 mm. under which conditions the piece shall be prepared in such a way that the rubber part is to be clamped at the top and held immovable while the weight is to be clamped to the fabric. The test strips shall be cut in both directions.

(16) Tuck's Packing: The friction in round Tuck's packing shall be tested by the same method as is used in plied hose, the core being drilled out to permit the insertion of a mandrel. Whenever the core is 5 mm. or less in diameter it shall be tested in its original shape. When it is over 5 mm. in diameter a piece 15 cm. long shall be separated from the fabric and cut and buffed on four opposite sides to form a square section 2 mm. by 2 mm. in the center of the test piece. The 2-mm. square shall be at least 25 mm. in length.

(17) Hydraulic Pressure Test of Rubber Hose: The hose shall be stretched out for inspection, connected to the pump, and filled with water, leaving the air cock open to allow the air to escape. The air cock shall then be closed with a pressure of 1 kilogram per square centimeter applied. The test is then begun by taking original measurements without releasing the pressure.

(18) All pressure measurements shall be made with a standardized gage. The increase in pressure shall be at the rate of 715 kilograms per square centimeter per minute and the hose under test shall be held for measurement not more than two minutes, unless otherwise called for in the specifications. The hose under test should be protected by a frame of metal or wood, or of heavy plate glass so that in case a piece breaks during the test the operator will not be injured.

(19) Steam Test for Rubber Hose: The arrangement of pipe connections shown in Fig. 9 is recommended. The header (1)

is provided with 6 outlets connected with a steam trap (3) that is provided with inlets and controlling valves. The hose to be tested is cut into lengths that will just fit between the connections on the headers, the bottom connections being made with unions. Steam at specified pressure passes into the header (1) and thence through the hose to the header (2) from which the condensation is carried to the steam trap. The hose under test should be protected by a frame of metal or wood or of heavy plate glass so that in case a piece breaks during the test, the operator will not be injured.

Notes on Accelerators.

By Henry P. Stevens, M.A., Ph.D., F.I.C.

ALTHOUGH the mineral accelerators such as magnesia and litharge have been used for many years, the term accelerator was seldom heard until the introduction of the organic accelerators or vulcanizing catalysts. As the latter term implied, these substances are believed to owe their efficiency to their catalytic effect as intermediary in the reaction between the caoutchouc molecule and the sulphur. This view is rather supported by the recent discovery of Peachey that vulcanization is effected by allowing sulphur dioxide and hydrogen sulphide gases to react in the presence of the rubber. The reaction takes place spontaneously at room temperature, showing the greatly increased reactivity of sulphur in the nascent (atonic?) state. Catalysts are supposed by some to owe their efficiency to the formation of intermediate products. In the case of accelerators, the intermediate product would be formed with the sulphur, which would then decompose, liberating the sulphur again and reforming the accelerator. The liberated sulphur would not be in the ordinary molecular state at the moment of liberation and might therefore be more reactive as in the case of the nascent sulphur liberated by the reaction between sulphur dioxide and hydrogen sulphide. It does not follow, however, that when an element is liberated in the course of a chemical reaction it is necessarily in a more reactive form. Sulphur liberated by reactions other than that described does not appear to vulcanize rubber. In such cases, either the element is not particularly reactive at the moment of liberation or the conditions are such that ordinary molecular sulphur is formed before the active form has had an opportunity to react with the caoutchouc or rubber present. It may be necessary that the catalyst should be in intimate contact (to use crude expression) with the caoutchouc molecules or aggregates. In Peachey's reaction we have a gas (sulphur dioxide) which is soluble in rubber to an appreciable extent. We may assume that the gas is in intimate contact with the caoutchouc aggregates, possibly adsorbed on the particles of which the colloid is composed. Under these circumstances vulcanization takes place when the sulphur is liberated and is so far complete that an ordinary degree of vulcanization can be obtained with hardly any free sulphur produced, that is to say, practically the whole of the sulphur reacts with the rubber at the moment it is liberated.

The organic accelerators are substances which easily mix with rubber, in fact they are probably soluble to a certain extent in raw rubber and consequently fulfil the above suggested condition of intimate contact in the event of their combining with sulphur and consequently liberating this sulphur in a more reactive form. If this theory is correct the liberation of the sulphur and consequent vulcanization of the rubber may be regarded as taking place instantaneously. On the other hand the formation of the intermediate substance by combination between accelerator and molecular sulphur may take an appreciable time period. If this be so the efficiency of an accelerator will primarily depend on the rate of reaction between it and molecular sulphur, provided that the substance formed can be dissolved or adsorbed to a sufficient extent by the caoutchouc with which it reacts. The reaction between the accelerator and the sulphur has been discussed by Bedford and Scott (THE INDIA RUBBER WORLD, January, 1920, page 207), who show that the efficiency of some accelerators is probably dependent upon the intermediate formation of thiourea derivatives as they react with sulphur at vulcanization temperatures. Similarly it has been suggested that the efficiency of isnitroso dimethyl aniline depends on its reduction and the formation of an amino derivative which actually functions as the accelerator. This, however, is not supported by the relative accelerating power of para nitroso phenol and para amido phenol. The former is an accelerator, the latter has no appreciable accelerating effect. In some cases it may be that the intermediate product is not so readily formed and requires a temperature higher than the ordinary vulcanizing temperature if it is to be produced in appreciable quantity. At any rate it is claimed that distinct advantages result from the use of the reaction product of the accelerator and sulphur over a mixture of the two. As examples, methylene-aniline and methylene-diphenyl diamine have been quoted. (British patent No. 130,857. THE INDIA RUBBER WORLD, November 1, 1919, page 80.) The main curing effect produced has been ascribed to the formation of their carbanilides. It is obvious that the action of accelerators may in many instances be very complicated and there is a large field open for investigation. My own work carried out years ago (1911 and 1912) showed that without a nitrogenous constituent rubber could hardly be got to vulcanize at all. Nature fortunately provided the rubber manufacturer not only with the raw material but also with the catalyzer necessary to effect vulcanization.

The action of inorganic accelerators differs in some respects from the organic accelerators. It is commonly stated that the latter are more efficient and this impression arises from the relatively small quantity of inorganic accelerators employed in rubber compounding, quantities such as ½ to 1 per cent on the weight of the rubber being commonly employed. It is obvious, however, that larger quantities would detract from the physical properties of the rubber, for, apart from their accelerating value, they are merely compounding ingredients without strength or elasticity. Moreover, the price would restrict the quantity employed. On the other hand, some of the mineral accelerators are generally regarded as exerting a beneficial effect apart from their accelerating action. The magnesias, carbonate and calcined, are examples. Large quantities of the light carbonate are used for the apparent toughening effect produced, apart from the small accelerating action which this mineral possesses. The calcined magnesia has very considerable accelerating power and is comparable with many efficient organic accelerators, particularly when used in quite small amounts—up to say ½ per cent. Kratz and Flower are of opinion that its accelerating power is only indirect. That is to say, it does not accelerate vulcanization by direct action on the rubber but merely liberates and renders more active the nitrogenous accelerator present in the rubber. Some of the organic accelerators are extraordinarily efficient—for example, dimethylammonium-dimethyl-dithiocarbamate (the addition product of dimethylamine and carbon bisulphide), which, according to Cranor, is rendered still more active in a rubber mix containing a small quantity of zinc oxide. One-half per cent of this accelerator enables satisfactory vulcanization to be effected in three or four minutes instead of 50 minutes. It was also found that spontaneous vulcanization of this stock takes place in the cold and the compound is very fairly vulcanized after one to two months'

storage at room temperature. The effect of zinc oxide in activating organic accelerators is not in the least understood. Twiss, in a recent paper, gave figures for some other organic accelerators which are similarly activated by a small quantity of zinc oxide; in fact without zinc oxide many of them would be of little use.

We have considered the accelerating effect—that is to say, the catalytic action—of these substances in promoting the union of caoutchouc and sulphur, but it is also of interest to compare the physical properties of rubber vulcanized with and without an accelerator. For this purpose we make use of the coefficient or percentage of combined sulphur calculated on the raw rubber as the basis on which to compare the physical properties; in other words, we determine the breaking strain and elongation of the specimens vulcanized to give the same coefficient. Gottlob noticed some time ago that there was considerable danger of overcuring—that is to say, formation of an unstable vulcanizate—if rubber containing an organic accelerator was fully vulcanized. In a series of cures it was found that without the accelerator the breaking strain of the overcured specimens showed a gradual reduction with the excess curing, while in the presence of an accelerator the decrease in tensile strength was very sudden. He did not, however, publish any aging tests in confirmation. The writer and others have shown that a pure rubber mix is best cured to give a coefficient of approximately 3, if tensile figures are considered in conjunction with aging tests. When, however, accelerators are added, it appears from Cranor's figures that the coefficient should be much lower if satisfactory aging results are to be obtained. When using powerful catalysts with a small proportion of zinc oxide it is probable that the rubber is sufficiently vulcanized when the coefficient amounts to one unit. The higher tensile figures obtainable by the use of organic catalysts appear, therefore, to some extent illusory. Some recent figures of Seidl are worth quoting in this connection. He made up four "mixings" and vulcanized for varying periods at 138 degrees C. The results in the accompanying table show the physical properties and time of cure for six fixed percentages of combined sulphur (*"Gummi-Zeitung,"* June 18, 1920, pages 797-8). The physical tests were made on rings of 4 square millimeters cross-sectional area, and I have recalculated the breaking strain to grams per square millimeter cross-sectional area.

Combined Sulphur Per Cent.	(1) 100 parts rubber. 10 parts sulphur.			(2) 100 parts rubber. 5 parts sulphur. 1 part accelerator.			(3) 100 parts rubber. 10 parts sulphur. 1 part accelerator.			(4) 100 parts rubber. 15 parts sulphur. 1 part accelerator.		
#	Breaking Strain. Grams.	Stretch. Per Cent.	Time of Cure. Min.	Breaking Strain. Grams.	Stretch. Per Cent.	Time of Cure. Min.	Breaking Strain. Grams.	Stretch. Per Cent.	Time of Cure. Min.	Breaking Strain. Grams.	Stretch. Per Cent.	Time of Cure. Min.
0.82	90	875	50	450	1,030	8	590	...	7½	1,280	875	5
1.63	590	927	140	990	969	24	1,170	919	15	1,900	841	12½
2.47	1,160	936	210	1,290	945	40	1,590	892	27	2,050	805	17½
3.21	1,540	895	288	1,570	932	58	1,780	852	40	2,250	773	22½
3.90	2,080	837	335	...	...	..	2,080	823	42	2,870	740	35
4.51	2,440	805	382	...	...	..	2,320	318	56	3,250	745	40

PHYSICAL PROPERTIES AND TIME OF CURE FOR SIX FIXED PERCENTAGES OF COMBINED SULPHUR.

To study this table we may concentrate on the first and third series of figures. The compounds differ only in that (3) contains 1 per cent of accelerator. This reduces the time of cure to about one-seventh or less. It will be noted that the sulphur is present in considerable excess even when the maximum amount (4.57 per cent) is combined. If the breaking strains are compared it will be seen that the addition of the accelerator produces a very considerable increase of breaking strain at the lower cures, that is, up to about 3 per cent of combined sulphur. For 3.9 and 4.5 per cent of combined sulphur the breaking strains are practically the same for both mixings. At this stage both are overcured. The difference in breaking strain is therefore confined to normal cures. The breaking strain of the accelerator compounded rubber with a coefficient .82 is approximately equal to that without accelerator having a coefficient of 1.63. Similarly the accelerator compounded rubber with a coefficient of 1.63 gives approximately the same breaking strain as that without accelerator having a coefficient of 2.47. Consequently to obtain a breaking strain of 590 grams per square millimeter a rubber and sulphur mixing must be vulcanized to double the coefficient which would be necessary if a suitable accelerator were added. To yield a breaking strain of 1,160 to 1,170 the use of a mix without accelerator will necessitate vulcanizing to give a 50 per cent higher coefficient. For a breaking strain of 1,540 to 1,590 the coefficient must be raised 30 per cent. With breaking strains over 2,000 the coefficient does not require to be raised and is practically the same for both mixes. We therefore have a progressive relationship. The difference in the coefficient required to produce the same breaking strain being less and less the higher the coefficient. With 1 per cent of the accelerator used by Seidl, the rubber would appear to be fully cured round about a coefficient of 2 to 2.5 against the figure of 1 suggested by Cranor for the very efficient accelerator which has been used in his experiments.

A comparison of columns 3 and 4 is also of great interest. The compounds used differ only in the percentage of sulphur. It has been stated that approximate proportional vulcanization exists between the coefficients and added quantities of sulphur in ordinary rubber sulphur mixings. The figures show that a similar condition holds for accelerator compounded mixings. The time required to produce the same sulphur coefficient is approximately two-thirds, in the case of the 15 per cent sulphur mix, of what it is in the 10 per cent sulphur mix. It is said that rubber can dissolve only a limited amount of sulphur—about 10 per cent and, therefore, larger quantities merely act as a diluent and tend to hinder rather than promote the reaction. As caoutchouc sulphide is formed, larger quantities of sulphur can be dissolved, as caoutchouc sulphide is a better solvent for sulphur than raw rubber. (Compare work of Skellon, also "Communications of the Netherland Government Institute for Advising the Rubber Trade and the Rubber Industry," 1916, page 239 *et seq.*) Consequently, as vulcanization proceeds, a larger proportion of sulphur is dissolved (if available) and an increase in rate of cure results. One would not expect such an increase until an appreciable proportion of sulphur had combined with the rubber. If we compare the third and fourth columns it will be seen that a considerable increase in rate of cure results from increasing the proportion of sulphur from 10 to 15 per cent. The time of cure is reduced from 7½ to 5 minutes and proportionately. At the same time the breaking strain is more than doubled. In fact with 15 per cent of sulphur the rubber appears fully cured with a coefficient but little exceeding one unit. If this is so, the coefficient corresponding to the correct cure will depend not only on the nature and proportion of accelerator but also on the proportion of sulphur added. It is not possible to speak positively until aging experiments have been carried out. In this connection I would much prefer tests made at about normal temperature, say not above 30 degrees C., rather than so-called accelerating aging tests at higher temperatures. Temperature is not the only factor in aging and it is doubtful whether it is safe to assume that the accelerated aging tests will give results comparable with those carried out at room temperatures.

The Manufacture of Battery Jars.

IN 1919 there were in round numbers 7,000,000 passenger cars in use in the United States. If one-half of this number were equipped with lighting and starting batteries that cost $40 each, the outlay would be $140,000,000 for batteries. The estimated number of starting and lighting batteries now in use is 5,253,073, valued at $236,388,285. Allowing three jars to a battery, 15,759,219 hard rubber jars, valued at $20,000,000, would be required.

It is estimated that there are 100,000 electric vehicles in the United States, of which 50,000 are passenger and 50,000 are commercial. The cost of the average battery is about $600 for a passenger car and $1,000 for a commercial car; a total expenditure of $30,000,000 for passenger and $50,000,000 for commercial cars. The average number of cells is 32 in a passenger car and 44 in a commercial, or a total of 3,800,000 jars. The average cost of a jar is about $2, therefore the total expenditure for hard rubber jars for electric vehicles will be $7,800,000.

There are other uses for storage batteries, such as supplying light and for power and ignition purposes in a great variety of applications. No substitute has been found as yet that will replace hard rubber for battery jars.

Battery jars are made mostly on white metal forms constituted of lead, tin and antimony. These forms are easily made and with very little machining. White metal is used in preference to cast iron although cast iron is more durable. The reason for this is that there are so many changes of sizes made by customers and a variation of shrinkage allowances due to the different kinds of raw material used, that it is easier to melt and cast a core over than it is to machine it.

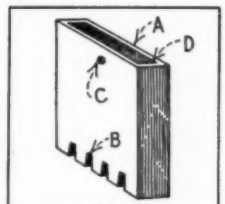


FIG.1

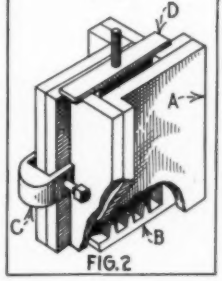


FIG.2

The core is shaped as shown in Fig. 1. The walls A are about ⅜-inch thick and the grooves B vary in number from two to as many as the customer specifies. At the bottom of the groove B two or more small holes are drilled into the air chamber D so that the ribs of the jar can be cured more easily, and then two larger holes are drilled in the sides as shown at C. This is done so that when the air expands in chamber D, while curing, it will have a chance to escape and when the jar is being pulled from the core, it allows an inlet of air so that no vacuum is created between the jar and the core, thus making it easier to remove the jar. These holes can also be used with a mechanical device to remove the battery jars from the forms after curing.

The molds used are of a collapsible type as shown in Fig. 2. Various sizes of angle-irons A are made to agree with the various sizes of jars being made. The base B acts as a gage to set up the angle-irons A and forms the rib places in the core. The angle-irons A are then clamped with special clamps C, four of which are used and then D is inserted to act as a core for the air chamber. This core is slightly tapered on the sides to draw easily when removing it from the mold. The core and angle-irons should be heated up to very near the temperature of molten metal. This can be done by immersing them in a pot of molten metal. As white metal has a greater specific gravity than iron, the iron parts will float. These parts will, therefore, take up enough temperature so as not to allow the molten metal to chill too quickly when pouring and will then give the surface of the form a very smooth finish. The metal is then poured in this form and a long wire rod is pushed in and out in the molten metal to remove any trapped air that would cause air holes in the cores.

The angle-irons A should be made very accurately and of sufficient strength so that they will not warp because of constant heating and changing of temperature.

A great deal of tin-foil about .005-inch thick is used throughout the manufacture of articles made from hard rubber, and the making of battery jars is no exception to this rule. It helps to handle the sheet rubber and is an asset in the vulcanization. It also gives the outside surface a polished effect. At one time the specifications for battery jars stipulated this surface condition but now it is not required. Before putting the jars in series into containers, the acid sometimes splashed and frequently ran over the sides, and if the jar was perfectly smooth the acid would run off, but if the sides were rough as they are when the jar is not made with tin-foil, the drops of acid would adhere to the sides and make a rather unsightly appearance.

After the stock is compounded it goes through a process illustrated in Fig. 3. The stock is first warmed in a mill shown at A and the operator then feeds the stock to the calender B. To keep the thickness of rubber more uniform and to eliminate all air pockets, the stock is plied, two or more plies, depending on the thickness required, on a large drum shown at C. This drum runs at the same speed as the calender B and is approximately 3 feet 6 inches in diameter and is water-cooled. The calender man applies a sheet of tin-foil to the drum C and the rubber sheet is plied on this tin-foil. Another man handles a hand operated conveyor shown at D and cuts the stock from the large drum in two pieces and lays it on a tray. The width of stock run from the calender is the correct length for wrapping around the core for making jars. It requires three men to operate these machines.

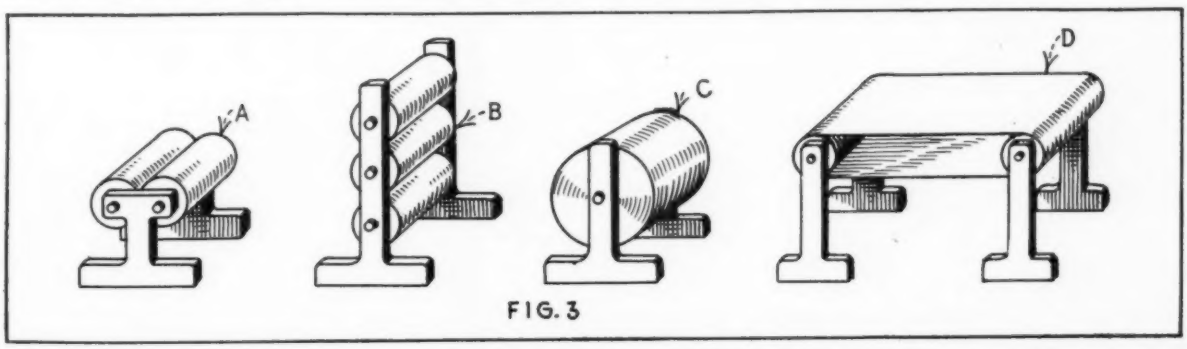
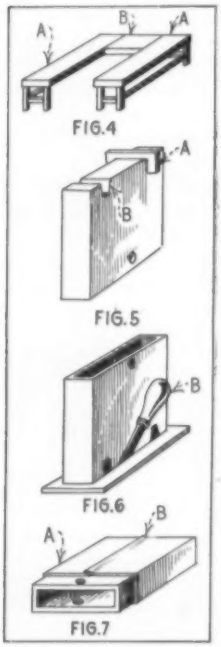


FIG. 3

The next step is to cut these sheets to correct widths for the jars, allowing a surplus for trimming top and bottom. This is done by laying the stock on a flat, smooth table, marking with a

piece of chalk and then cutting to size with a knife. When tin-foil is used these sheets can be stacked but when it is not used, trays or books with several sheets of holland must be used.

A gang of six men work at a table shown in Fig. 4, with wooden tops A and a steam-table B which carries approximately eighty pounds' pressure. These men make up the jars and remove them from the cores after they are cured. For this work they get from five dollars to eleven dollars per 100 jars, depending on the make and size. One of these men is called the leader and is directly responsible for the men and for defective jars made by his gang. The steam-table is used to warm up the cores and stock. When the core is warm, it gets a coat of silicate of soda which dries very quickly. This solution prevents the finished jar from sticking to the core and facilitates its removal from the core.



The ribs are then assembled in the core cavities as indicated in Fig. 5. They are inserted (See A) and pressed down with the knife handle used for trimming; the trimmed rib is shown at B. These ribs are made from a dry stock, mostly hard rubber dust and shoddy, and soap-stoned so that they will not stick to the core. After the ribs are trimmed, the bottom and ribs are coated with cement and placed on a piece of rubber which forms the bottom of the jar. The core is then turned over as shown in Fig. 6 and the rubber is trimmed with the knife B using the core as a guide. The sides are then cemented so that the rubber will stick to the core.

The sides are next wrapped as shown in Fig. 7 and the rubber sheet A trimmed at B. By pressing the knife handle along the edge B the impression shows where the stock meets. Using this impression as a guide, the surplus stock is trimmed off and the sides are then rolled down to press out any trapped air between the core and walls. This is done with a steel rolling pin, weighing about fifteen to twenty pounds.

The top is next trimmed as shown in Fig. 8, using knife B and a wooden block A, which is the correct height. A hard rubber block as shown at C is then inserted, the thickness of which allows enough rubber to be turned over on the bottom after trimming with the knife D. The edges are then turned in as shown in Fig. 9, working from both ends, first at A and then B, when the reinforcing strips are assembled as shown in Fig. 10 at A.

The identification of the customer and the gang number are then stamped on the jars which are stacked on small heater trucks, care being taken that they do not touch each other, and they are vulcanized from four to four and one-half hours at approximately fifty-five pounds pressure.

Some manufacturers have designed and built machines for wrapping battery jars mechanically, but these machines, although doing a better job than the hand method, do not materially increase production over the manual method.

After removing the jars from the heaters, the tin-foil is immediately removed because if it is left on, the jars take a brownish color. After cooling in the air between five and ten minutes, the jars are partly stripped from the cores. This is so that the jars will not warp or shrink by giving them time to set. If battery jars become set on the cores it is very difficult to remove them without frequent breakage and damage to the core. There are several methods of removing jars from cores and some are by rather ingenious mechanical devices. The simplest is a hand method in which a tool similar to ice tongs is used, only that instead of sharp points on the ends, they have two parallel bars. With this method fewer jars are broken in removing them.

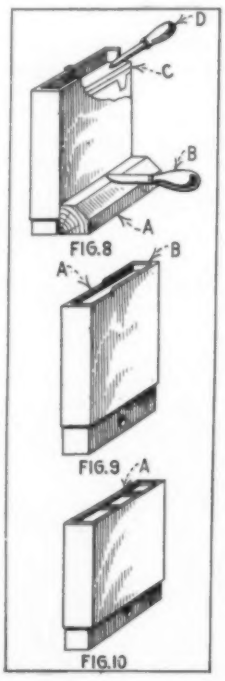
After fifteen minutes the jars are completely removed from the cores and piled neatly on the floor until they are completely cooled. The bottom and top of the jars are then ground to a finished dimension as specified by customers. This is done on either disk or belt grinders. The belt grinders are used mostly for smoothing up the jar seams. The bottom is ground first and held to a close limit in relation to the inside ribs. These ribs are important as they hold up the positive and negative plates with the separators, and the sediment created by the acid drops to the bottom, thereby eliminating short circuiting of the battery. The tops are then ground square with bottom and the seams touched up on a belt grinder, when the jars are ready for the electrical test.

Battery jars are given an electrical test of 18,000 to 30,000 volts as specified by the customer. At one time a water test was made by sealing up the jar and putting it under approximately 4 pounds' pressure. This test has long been disregarded. The following elongation and tensile strength test and standard test piece was adopted August 27, 1918, by the Hard Rubber Division of the War Service Committee:

ELONGATION AND TENSILE STRENGTH.

The elongation is to be based on a 3-inch measured test section. Measurement must be made before test sample is put into the testing machine. Either dividers or extensometers applied to the test piece at the ends of the measured length may be used to measure elongation. The dividers or extensometers used in measuring the elongation must be free from, and independent of, the testing machine or any movement of the heads.

The tension test is to be made in a Tinius Olsen, or similar testing machine of suitable capacity. The rate of speed of the separation of jaws shall be uniform and shall be between 1/10-inch and 2/10-inch per minute. The test pieces before breaking shall be immersed in water for one hour at a temperature of 70 degrees F. Battery jar test pieces are to be broken in testing machine room temperature of between 70 and 80 degrees.



CLAIMS FOR REHEARING.

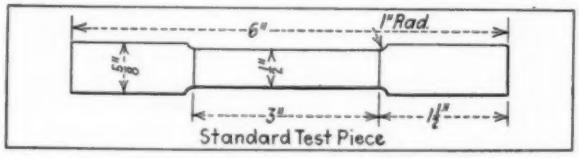
Rejected material and samples of it will be held for one month from date of test report. Accordingly, in case of dissatisfaction with the result of test, the shippers must make claims for rehearing, should they desire it, within that time. Upon application for rehearing, the shipper may send a representative who may sort the rejected jars, accept as rejected such jars as he desires, and submit for further test the balance claimed within the specification. Such balance shall be tested in the presence of the shipper's representative, the samples being paid for by the shipper.

For such retest five jars shall be selected at random from each thousand, or from each lot, and should the average of test meet the specifications, the lot tested shall be accepted. This does not apply to individual rejections.

After passing the various tests the jars are ready for shipment.

REPAIRING DEFECTIVE JARS.

Some jars that are defective or those that are rejected can be repaired very easily. If a jar does not stand up to the electrical test, a hole is burned in it. This is caused by some minute particle of dust or metal. The jar can be repaired by filling up



the hole with gutta percha and revulcanizing with a small electric vulcanizer. If the jar is warped or under size, it can be straightened and stretched by placing it on the steam-table until it is soft, when it is straightened by forcing it gradually over the core on which it was made.

PROPOSED TENTATIVE METHODS FOR TESTING TEXTILES.[1]

TYPE OF MACHINE.

1. TEXTILE TESTING MACHINES shall be of the inclination balance or pendulum type.

TESTING MACHINE CAPACITY.

2. In selecting the proper capacity of testing machine for a given fabric, the maximum capacity of the machine shall conform to the following:

Breaking Strength of Fabric, Pounds.	Maximum Machine Capacity, Pounds.
0—25	50
10—50	100
20—100	150
50—200	300
50—300	400
250—650	800

ANGLE OF PENDULUM.

3. The maximum angle of swing of the pendulum shall be 40 degrees from the vertical.

RATE OF LOADING.

4. The rate of loading in textile testing machines shall be 250 pounds per 1 inch of traverse of the head jaw.

TYPE OF JAW.

5. The jaws in textile testing machines shall be of the flat anvil type, both anvils being free to swing on a horizontal axis. The anvil faces shall be smooth and no friction cloth shall be used. The anvils shall be closed at a uniform and invariable pressure by means of an eccentric and lever.

CRIMP.

6. Crimp shall be defined as the difference in distance between any two points on a yarn in a fabric and the same two points after the yarn has been removed and straightened. This difference shall be reduced to percentage of the yarn length as it lies in the fabric.

OFF-SQUARE.

7. The percentage of warp crimp minus the percentage of filling crimp shall be defined as the off-square of the fabric.

METHOD OF DETERMINING CRIMP IN TIRE FABRIC.

8. Threads for crimp test shall be taken from the inside edge of test piece as near the center line of the roll as possible. Threads for crimp test shall be laid out by marking across them in the fabric parallel lines not less than 6 inches apart. An even number of threads not less than four in number shall be taken for each warp and each filling test. These threads shall be raveled from the fabric after marking, allowing about 2 inches extra on each end of the threads beyond the marks. The threads shall then be straightened by a machine which applies a constant load of 75 grams and the length between the original markings shall then be read in terms of the yarn length as it lay in the fabric. The machine shall be equipped with a dial or scale so arranged as to read the percentage crimp directly.

[1]Published by courtesy of the American Society for Testing Materials. Report of Committee D-13, read at the annual meeting of the Society at Asbury Park, New Jersey, June 22-24, 1920.

THE INTERNATIONAL CHAMBER OF COMMERCE.

The first meeting of the International Chamber of Commerce was recently held at Paris, France. Some 500 delegates from the five countries that participated last fall in the International Trade Conference—Belgium, Great Britain, France, Italy and the United States—were in attendance. An organization was effected and officers and directors elected. Business interests in other countries will be taken into membership later.

The meeting gave the delegates an opportunity to take up many questions of international business relations. The more important matters on which action was taken were as follows:

Restoration of international credit, based on fixation of the amount and the conditions of payment for the debts of all countries, allies or enemies; allied states should agree to fix definitely the amount and conditions of payments according to the stipulations in the treaty; avoidance of duplicate taxation of wealth of individuals or organizations in more than one country; reduction of unnecessary expenditures of local and national governments; reciprocal international treaties relative to import and export taxes; an international credit bureau was planned; national and local chambers of commerce requested to cooperate with their governments to reduce national and local governmental expenditures; governments and banking, commercial and industrial associations in all countries urged to cooperate with the International Chamber and with each other to reduce importation of nonessentials by countries whose exchanges are depreciated, and to increase exportations from such countries; endeavor to obtain the cooperation of labor to prevent delay in the turn-around of ships, delay between ships and trains, and delay in transportation by rail; restriction upon countries whose exchanges are depreciated issuing foreign loans; a reconstruction special committee to study the exchange situation; inducement of foreign investments in home countries; encouragement of tourists through removal of unnecessary restrictions; facilitation and simplification of passport procedure; committee to investigate the mischievous use of trade names and of misleading indications; common nomenclature for customs tariffs of the allied nations; revocation of import and export prohibitions as soon as internal conditions of each country will allow; petition to the Board of Directors to establish a central bureau for international statistics covering production with forecast of output and probable needs of each country; utilization of hydro-electric power, development of measures for the use of mineral fuel scientifically and economically, and development to the utmost of research in the extraction of coal and oil resources of the world.

The full meeting expressed an opinion that Germany had not demonstrated an intention to fulfill its obligations to the Allies, as agreed in the Treaty of Versailles. Allied governments were urged to tolerate no further delay in the carrying out of the treaty agreements.

The next meeting of the International Chamber will be held in London, England, next June. Temporary headquarters have been established in Paris. The location of the permanent headquarters is left to the Board of Directors.

UNDER THE TRADE NAME "SWEET RUBBER CEMENT NAPHTHA," a solvent is being offered to the rubber trade that is said to give excellent service in the manufacture of rubber cement. The product is refined entirely from Bradford, Pennsylvania, crude oil. There is no mixture of any kind. It has a very sweet odor, an initial boiling point of 112 degrees F. and a final boiling point of 326 degrees F.

Construction of Steam Hose.[1]

By John M. Bierer.[2]

STEAM HOSE can be constructed with a seamless machine-made tube, or with a tube plied from calendered stock. Furthermore, the hose can have for its fabric element a duck of given weight and number of plies or a combination of plied duck and one or more plies of braid. To determine whether it is more satisfactory both to user and to manufacturer to make a seamless or a plied tube, and to make a simple multiple-ply duck construction or a combination duck and braid construction, three series of tests, carried out individually and independently by The B. F. Goodrich Co., The Goodyear Tire & Rubber Co., and the Boston Woven Hose and Rubber Co., have been made, the results of which are here offered.

The actual steam hose tested by the three investigators was obviously of different material, particularly as to compounds, so it is most reasonable and enlightening to survey the different series separately in order not to make the materials a factor in any comparison of constructions.

The tests by the Goodrich experimenters endeavored to compare both seamless with plied tubes and simple duck with duck-braid construction. All samples were 1⅝-inch inside diameter, with tube ¼-inch thick, cover 1/32-inch thick, duck 20 ounces per square yard and braid 12⅔ yarn. The hose was tested in a vertical position (so as not to have condensed steam present), under intermittent steam pressures, ten hours under pressure and two hours' rest until failure.

The results of the Goodrich tests are summarized in Table I. Each result represents an average of five individual samples of each construction.

Sample B was of distinctly lighter weight than A or C, so it is not surprising that failure occurred earlier than the A and C samples, which were comparable to each other. C and D were different only in the construction of tube, so that the longer service of C was undoubtedly due to the absence of seams, joints, or plied surfaces, which tend to open up. Similarly, A and C were different in fabric construction, with the same tube, so that the better endurance of C can safely be laid to the superiority of the simple plied duck to the braid and duck construction.

It takes little studying of these experiments to notice two facts already known to many familiar with steam hose. The steam hose with seamless tube lasted about half again as long as that with a plied tube; and likewise the hose with simple duck of sufficient plies lasted about half again as long as the hose with a combination of duck and braid.

Summarizing the experiments of The Goodyear Tire & Rubber Co., there appears a series of similar results. Table II represents an average of five individual samples of each construction. Comparison is offered in this series also of seamless and plied tubes, of duck and duck-braid constructions, and of expansion and contraction measurements as well. Like the Goodrich tests, the hose was tested ten hours under pressure and two hours' rest until failure.

TABLE I.—RESULTS OBTAINED IN TESTS BY THE B. F. GOODRICH CO.

	Sample.			
	A	B	C	D
Number of plies of duck	3	4	6	6
Number of plies of braid	2	0	0	0
Tube	Seamless	Seamless	Seamless	Plied
Endurance under 60 lb. pressure, hours	2261	904	3143	2170

Owing to details of manufacture, there is necessarily not found the same percentage ratios of endurance among the various constructions that were found in the Goodrich tests, but inspection of the results will reveal certain facts more important than this detail. The hose with the seamless tube C outlasted that with the plied tube D and the hose with the simple plied duck construction C outlasted that with a combination of duck and braid E. These results, though not so strikingly shown, are in accordance with those obtained in the Goodrich experiments. A further feature should be noted, that though the expansion in lateral dimensions and contraction in length are favorable to the duck-braid construction, the difference is so small between the two styles that any real and practical superiority for the braided hose would be negligible in practice.

The next experimental data to show divergence among the constructions are those obtained at the Boston Woven Hose & Rubber Co. laboratories. In order to determine the relative value of a hose with simple plied duck and hose with a combination of duck and braid, and to determine the relative value of seamless tubes and plied tubes, the following constructions were given prolonged tests. All hose was of 1-inch inside diameter, ⅛-inch tubes, 0.050-inch covers, and was tested in 3-foot lengths. Two series of tests were carried out: the first at 60-pound steam pressure intermittently 124 hours on and 44 hours' rest, the second continuously at 180-pound pressure, both until failure. Eight individual samples were tested in each series and the results summarized are an average of these:

TABLE II.—RESULTS OF EXPERIMENTS OF THE GOODYEAR TIRE & RUBBER CO.

	Sample.				
	A	B	C	D	E
Number of plies of duck	2	4	6	6	3
Number of plies of braid	2	0	0	0	2
Tube	Seamless	Seamless	Seamless	Plied	Seamless
Endurance under 60-lb. pressure, hours	1506	1198	1624	1493	1612
Expansion of diameter in 1,000 hours, per cent.	6.1	12.2	8.2	8.1	7.0
Contraction in length in 1,000 hours, per cent.	1.6	3.2	3.7	3.6	1.8

For a given fabric construction, hose with seamless tubes A lasted about one-fifth again as long and B almost twice as long as those with plied tubes C and D. Furthermore, for the same style of tube, hose with simple plied duck A lasted half again as long and C over twice as long as those with duck and braid construction B and D.

In these tests, owing to particularly careful workmanship on the samples, failure was not due primarily to separation of the seam or joint on the inner surface of the tube. But in the ordinary process of manufacture, without such undue care and special attention, the plied tube is always a danger, and this splitting and opening up of the tube is practically a fatal objection to the success of any hose by this method. This series is a clear case of superiority of seamless tubes over plied tubes, and of simple plied duck over a combination duck and braid construction.

TABLE III.—RESULTS OBTAINED BY THE BOSTON WOVEN HOSE & RUBBER CO.

	Sample.			
	A	B	C	D
Number of plies of duck	6	3	6	3
Number of plies of braid	0	2	0	2
Tube	Seamless	Seamless	Plied	Plied
Endurance under 60-lb. intermittent pressure, hours	2607	1770	2143	950
Endurance under 180-lb. constant pressure, hours	67	26	62	17

CONCLUSIONS.

Three different experimental laboratories, working individually and independently, found consistent results in an effort to determine the relative values of seamless and plied tubes, and of

[1] Published by courtesy of the American Society for Testing Materials. Paper read at the annual meeting of the Society at Asbury Park, New Jersey, June 22-24, 1920.

[2] Chemist, Boston Woven Hose & Rubber Co., Cambridge, Massachusetts.

simple duck and duck supplemented by braiding. From the data gathered, there are two conclusions concerning these relative values which are obvious and irrefutable:

1. Steam hose made with seamless tube (in practice by the tube-machine method) is superior in endurance under steam pressure to hose with tube made up of successive plies of a sheeted stock, sometimes known as a calendered tube. The hose with plied tube was found to fail by the splitting and separation of the seam necessarily formed at the surface of the tube in its construction.

2. Steam hose with its fabric constructed of successive plies of frictioned duck is superior in endurance to, and the practical equal in expansion and contract of hose made of a fewer number of plies of duck supplemented by plies of braiding.

It is most advantageous to user and to manufacturer alike to construct steam hose with a seamless tube and for its fabric element a sufficient number of plies of duck only.

SPECIFICATIONS FOR RUBBER JAR RINGS.[1]

GENERAL.

THIS SPECIFICATION covers the requirements for rubber jar rings to be used for the canning of vegetables, soups, meats, fruits, etc.

TESTS.

TECHNICAL.

(a) Measurements	Minimum.	Maximum.
Internal diameter	2.20	2.32
Width of flange	.28	.34
Thickness	.078	.09
Tensile strength	350 lbs. per square inch	
Ultimate elongation	150 per cent.	

Tensile strength and elongation determined in machine jaws separating at rate of 20 inches per minute.

PRACTICAL.

A rubber ring may meet the tests as to thickness, width of flange, and inside diameter and still be unfit for use with the cold-pack method, consequently the following practical tests should be applied.

BOILING WATER TEST.—Select three jars, one having a very even top, well fitted; one, a top somewhat warped; and one, a very poorly fitting top. Fill the jars three-quarters full with boiling water, place the rubber rings in position, partially seal the jars, place them in the water bath under canning conditions, and boil for four hours. At the close of the period, remove the jars from the bath, tighten down the clamps, permit the jars to stand over night and then open. The rubber rings when removed and examined carefully should show the indentation of the top on the ring clearly and distinctly. There should be no signs of movement of the rubber ring, and the ring should still have much of its strength and elasticity and should show no signs of cracks or cuts resulting from pressure on the jar due to the vacuum within.

STEAM PRESSURE TEST.—Select, fill, and seal the jars as for the boiling water test. Place the jars in a steam-pressure canner and sterilize for two hours under 10 pounds steam. At the close of the period permit the pressure to drop naturally and remove the jars in the same manner that canned fruit or vegetables would be removed. Press the clamps down, allow the jars to stand over night, and then open. The conditions found should be the same as specified under the boiling water test.

OVEN, OR DRY HEAT TEST.—Many rubber rings are satisfactory when first manufactured, but upon aging become unfit for use. In order to apply this aging test, tie three new rubber rings to a string and suspend them in the oven at 300 degrees F., dry heat, for 1 hour. At the end of that time the rubber may show small cracks on the surface when bent back upon itself, but should not crack through.

TESTS MADE BY THE HOUSEWIFE.—The following tests may be carried out by the housewife to determine the quality of jar rings:

(a) Tensile strength.

Fill a light-weight pail with one gallon and seven pints of water (total weight approximately 17 pounds). Place the jar ring around an empty spool; pass a wire through the center of the spool and fasten to handle of the pail; then pass the round handle of a wooden spoon or broom through the ring and lift. The ring should not break.

(b) Elongation.

Cut a six-inch piece out of a ring; take hold of the ends so that there are four inches between the fingers; stretch the piece along a ruler until the fingers are ten inches apart. The sample should not break.

(c) Twelve rings stacked should measure approximately one inch.

(d) Marking.

Packages of rings should be plainly labeled with the year of the canning season during which they are to be used. They should pass these specifications throughout the year to meet the approval of the Department of Agriculture. Rings left over may either be sold the following year in the original containers, or, if they will still pass specifications, may be repacked or relabeled. The manufacturer or dealer doing this shall assume all responsibility in redating the cartons.

[1]Submitted to Department of Agriculture by the Department of Commerce, Bureau of Standards, Washington, D. C.

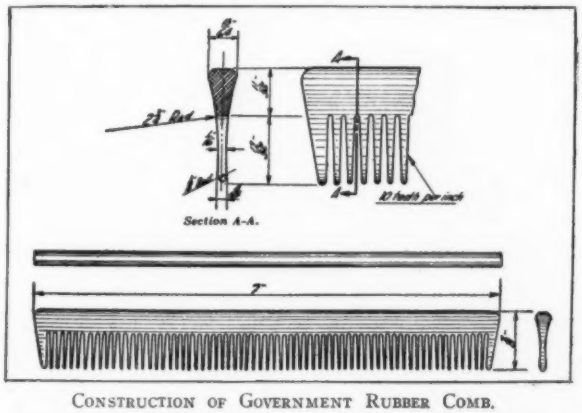
WAR DEPARTMENT SPECIFICATIONS FOR RUBBER COMBS.

NO. 336-1-1, JUNE 5, 1919.

GENERAL.—The comb shall be made of highest quality black hard rubber, have an oval back, mat finish, and the entire comb rubbed to a very smooth finish so that there shall be no sharp edges on or between the teeth.

CONSTRUCTION.—See drawings, which are a part hereof.

Length, 7 inches; 10 teeth to the inch; 7/8-inch from the point of the teeth to the tip of the back. The teeth shall be 17/32-inch



CONSTRUCTION OF GOVERNMENT RUBBER COMB.

long and the distance from the base of the teeth to the tip of the back shall be 11/32-inch. Thickness of comb through heaviest part of the back shall be 13/64-inch and narrowest part, about the middle of the teeth, shall be 1/16-inch through; at the heaviest part of the teeth, near the end, shall be 1/8-inch. Thickness of the teeth through the comb shall be 5/64-inch.

WEIGHT.—Shall be not less than 9 nor more than 10 grams.

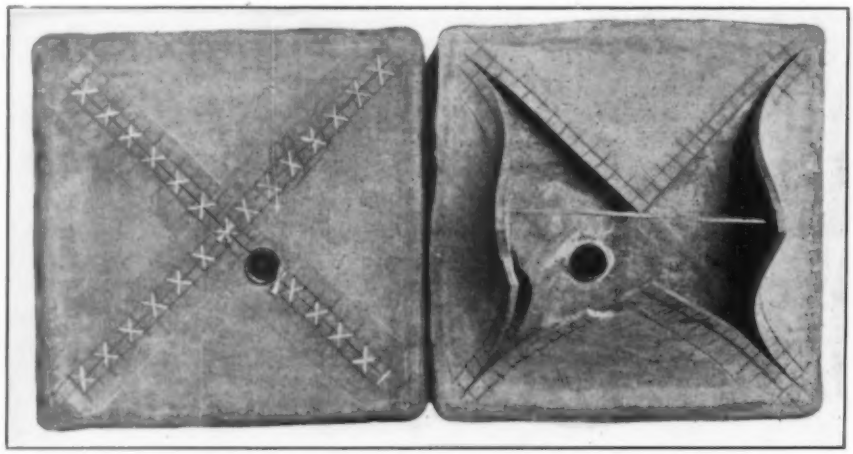
VIROL.

An organic accelerator described as being powerful, but not expensive, is the latest material in that line offered to rubber manufacturers. It is safe and can be used in any stock. Besides hastening the cure it is said both to toughen the stock and improve its aging quality.

Rubber Armor for Airplane Gasoline Tanks.

RUBBER was long ago suggested as a possible defensive armor for battleships, the idea being that many projectiles would not penetrate it owing to rebound and deflection, and that holes made by those which did pierce the rubber would quickly and almost completely close again. While this dream has never materialized, one of the most vital, vulnerable and dangerous parts of airships is now being protected on the same principle with much success, and an added measure of safety and endurance has been given to Uncle Sam's bird-men by rubber.

Gasoline tanks on United States Army airplanes are being equipped with rubber and fabric coverings in order to prevent leaks in case the tank is penetrated by bullets and thus the fire hazard is reduced. There are two types of these leak-proof coverings, detachable and fixed, the former being furnished whenever practicable.



DETACHABLE LEAK-PROOF COVERING FOR ARMY AIRPLANE GASOLINE TANKS.

The tank or tank form is first covered with tire breaker fabric with the coated face outside. A 1/16-inch ply of pure, first-grade washed and dried smoked sheet rubber is then applied over the breaker fabric. Over the crude rubber is applied a 3/8-inch layer of rubber compound, and the three layers are rolled down into close and uniform contact over the whole surface of the tank, when the completed covering on the tank or form is vulcanized and the accessory fittings for filling the tank are installed. The coverings conform to government dimensions and a tolerance of plus 1/8-inch is permitted on overall height, breadth and length. No minus variation in the thickness of the walls is allowed. All openings for accessory fittings are reinforced with fabric strips or washers.

Coverings of the detachable type have four triangular end flaps laced together which permit insertion or removal of the tank. Attached along the edges of these flaps before vulcanization are strips of 17¼-ounce tire duck. These fabric strips are to reinforce the edges which hold the lacing eyelets, which are standard brass grommets.

The rubber compound from which the main body of the rubber covering is made contains not less than 92 per cent by weight of new washed and dried, hard fine Pará, or the highest grade only of new *Hevea* plantation rubber, 6 per cent by weight of sulphur, and not more than 2 per cent by weight of magnesium oxide.

The utmost precautions are taken to safeguard the quality of the materials and workmanship. The required tensile strength of the compound is at least 1,800 pounds per square inch. The elongation of a two-inch section at the breaking point is at least 700 per cent. When the specimen is stretched from two to fifteen inches, held in the stretched position for ten minutes and then released for ten minutes, the permanent elongation must not exceed 12½ per cent. Great care is exercised during the whole manufacturing process to exclude grit, dust or foreign substances from the interior of the tank.

Tensile test specimens of the rubber compound are cut with a die from samples furnished by the manufacturer, or from a sample covering. Samples are required to be approximately 3/32 or 1/8-inch thick with the constricted portion of the specimen ¼-inch wide and having smooth edges.

Manufacturers are required to furnish, at their own expense, with each heat of tank coverings, a sample eight inches square of the covering made up as applied to the tank. It must be vulcanized at the same time and under the same conditions as the coverings it represents, and be guaranteed to consist of the same materials. All materials and finished coverings are subject to inspection by the Inspection Section, Procurement Division, of the Air Service, and acceptance or approval of the materials in process does not infer acceptance of the finished product. All accepted coverings are plainly marked with the official acceptance stamp of the Air Service. The manufacturer's name or trade-mark, the Air Service production order number, style of covering and the date of manufacture are permanently impressed on the outside of each rubber covering, and the coverings or covered tanks are packed for shipment as directed by the purchaser.

The Air Service reserves the right of free access for its inspectors to all parts of the manufacturer's plant concerned in the manufacture of these coverings; also of adequate facilities for determining that the materials and coverings conform to specification, and of the opportunity to check and mark all materials in process or in stock.

The information and illustration used in this article were supplied by the Specifications and Standards Section, Engineering Division, Air Service, United States Army, Dayton, Ohio.

ADJUDICATED PATENTS.

ELYRIA NATIONAL RUBBER HEEL CO. *vs.* I. T. S. RUBBER CO. United States Circuit Court of Appeals, Ohio.

The Tufford reissue patent, No. 14,049, for a rubber heel, held not infringed on review of an order granting a preliminary injunction. ("Federal Reporter," volume 263, page 979.)

ST. LOUIS AS A MANUFACTURING CENTER.

The St. Louis, Missouri, Chamber of Commerce is circulating very convincing literature telling manufacturers who are contemplating a change of location, or the establishment of a branch office, just why St. Louis should be chosen.

The city's recent successes in inducing large business concerns to come there are chiefly due to central location, favorable transportation facilities and rates both by land and water, available raw materials, and the excellent living and housing conditions.

A Direct Method for the Determination of Rubber Hydrocarbon in Raw and Vulcanized Rubber.[1]

By W. K. Lewis and W. H. McAdams.

INASMUCH as this paper will not deal with the structural formula of rubber, the conventional formula $(C_{10}H_{16})n$ will be used to designate rubber hydrocarbon, with the understanding that this contains $2n$ double bonds. Two types of reaction are possible, involving in the first case, addition, and in the second, substitution, of bromine.

$$(C_{10}H_{16})n + 2n\,Br_2 = (C_{10}H_{16}Br_4)n \qquad (1)$$

$$(C_{10}H_{16})n + n\,Br_2 = (C_{10}H_{15}Br)n + n\,HBr \qquad (2)$$

In the second reaction it will be noted that *two* atoms of bromine are necessary to substitute *one* atom of hydrogen, thereby producing one formula weight of hydrogen bromide.

This paper deals with the application of the McIlhiney method, developed for unsaturated oils, to rubber hydro-carbon. Briefly, it consists in determining by a volumetric method the substitution which does occur under the particular conditions of the analysis in question, and deducting twice the observed substitution from the bromine consumed, which gives the measure of the true bromine addition, from which the rubber hydrocarbon is readily calculated.

RAW RUBBER PREPARATION OF PURE RUBBER HYDROCARBON SOLUTION.

Plantation pale crêpe was extracted overnight with acetone in the standard extraction apparatus to remove the resins, then carefully dried, dissolved in pure carbon tetrachloride, and finally filtered to remove the proteins and other insoluble matter. The resulting hydrocarbon was analyzed by evaporation to determine the total solids present in a known volume, and this known rubber hydrocarbon content was used as a basis of comparison with the calculated figures found by bromine addition as described below.

PROCEDURE.

To a known volume of the above pure rubber hydrocarbon solution, containing approximately 0.2 g. $(C_{10}H_{16})n$, a measured volume of bromine in pure carbon tetrachloride corresponding to approximately 150 per cent excess bromine above that necessary for addition was added, and the mixture was allowed to stand in glass-stoppered bottles for varying lengths of time in a dark closet at room temperature. After this exposure to bromination, 10 cc. of a three per cent potassium iodide solution were added to take up the excess bromine, and the resulting iodine was titrated by means of 0.25 normal standard sodium thiosulphate, using starch paste as an indicator. In order to determine the substitution which had occurred, 10 cc. of five per cent potassium iodate were now added to convert the equivalent of the hydrogen bromide into iodine, which was then titrated to a second endpoint. A blank was run under the same conditions as the rubber determination in order to determine the bromine added to the rubber analysis, and to eliminate any error caused by impurities in the reagents used. The sample calculation given below indicates the relations of the various ratings:

Rubber taken = 0.2000 G. Thiosulphate Solution = 0.235 Normal
Equivalent Weight of Rubber Hydrocarbon, $(C_{10}H_{16})n$ = 34

	Cc. Thio.
For blank	70.00
Excess found by first titration	38.00
Consumed	32.00
Twice second titration, (2) (3.5)	7.00
True addition	25.00

$$\frac{25.00 \times 34 \times 0.235 \times 100}{0.2000 \times 1000} = 100 \text{ per cent theoretical addition}$$

Notes: In order to avoid loss of bromine vapor upon opening the bottle after the bromination period, the bottle was cooled by immersion for a few minutes in ice water, in the dark, and the potassium iodide solution was introduced by means of 1-inch rubber tubing attached to the neck of the bottle and extending up above the stopper.

The carbon tetrachloride was purified by subjecting it to the action of saturated chlorine water for several days in diffused daylight, followed by washing with water and drying with calcium oxide, previous to a distillation in which the fraction boiling within one degree C. of the proper boiling point was taken.

VULCANIZED RUBBER.

The above results have shown the method to be satisfactory for raw rubber; it remained to adapt it to vulcanized rubber. Since carbon tetrachloride will not "dissolve" vulcanized rubber, a new "solvent" had to be obtained, and the choice was tetrachlorethane.

In addition to the rubber hydrocarbon, resins, and proteins present in raw rubber, vulcanized rubber may contain fillers and compounding materials, such as mineral oxides or salts, carbon, mineral rubber, organic accelerators, vulcanized oils (factice), free sulphur, and sulphur combined as polyprene disulfide, $(C_{10}H_{16}S_2)_n$.

The acetone extraction of the finely cut sample was made to remove not only resins but also free sulphur and other acetone soluble materials. The rubber residue was dissolved by refluxing with tetrachlorethane[2] for several hours, diluted to a definite volume with carbon tetrachloride, and allowed to settle, then an aliquot part was pipetted out for bromination as in Brandegee's method. The finely divided fillers were excluded from the aliquot part so taken by placing a wad of cotton in the tip of the pipette, and applying a gentle suction.

COMBINED SULPHUR PROCEDURE.

The combined sulphur was found by evaporating to dryness in a porcelain casserole an aliquot part of the tetrachlorethane solution free from insoluble matter, and determining the sulphur by the method of Davies.[3] This consisted in adding 10 cc. of saturated arsenic acid solution, 10 cc. of fuming nitric acid, and three cc. of bromine water and evaporating to a sirupy consistency. (If all the organic matter is not destroyed, more fuming nitric acid is added, and the mixture again evaporated to a sirupy consistency.) After the addition of a few crystals of potassium chlorate, the solution is evaporated to dryness, heated to boiling with 50 cc. of ten per cent hydrochloric acid solution, filtered through paper, and diluted to 300 cc. with distilled water in a beaker. The sulphuric acid is precipitated as barium sulphate by the addition of barium chloride, and determined gravimetrically in the usual manner.

CALCULATION OF TOTAL RUBBER HYDROCARBON.

The rubber hydrocarbon combined with the sulphur thus found is calculated by multiplying the percentage of sulphur by

$$\frac{C_{10}H_{16}}{S_2}, \text{ or } \frac{136}{64} = 2.13.$$

[1] Published by courtesy of the American Chemical Society. Read before the Rubber Division of the American Chemical Society, at St. Louis, Missouri, April 12-16, 1920.

[2] This solvent was purified in the same manner as the carbon tetrachloride.

[3] "Chemist-Analyst," 15 (1915), 4. THE INDIA RUBBER WORLD, October 1, 1916, page 11.

The total rubber hydrocarbon is calculated by adding the rubber hydrocarbon combined with the sulphur and the uncombined rubber hydrocarbon found from the bromine addition.

PROCEDURE FOR VULCANIZED RUBBER.

Extract a weighed sample (approximately 1.5 to 2.0 g.) of vulcanized rubber with acetone for 8 hours in the standard extraction apparatus, evaporating the acetone to obtain the percentage of acetone-soluble material.[4] Aspirate carbonic acid through the rubber to remove the traces of acetone, reflux four hours, with approximately 100 cc. of tetrachlorethane, cool, and make up to mark in a 250-cc. calibrated flask with carbon tetrachloride. Remove a 25-cc. aliquot portion by applying gentle suction to a pipette containing a small piece of cotton in its tip. Place this sample in a glass-stoppered bottle of 250 to 500 cc. capacity, add from a burette a measured amount of bromine in carbon tetrachloride corresponding to at least 100 per cent excess bromine above that necessary for the addition reaction, insert the stopper tightly, and allow to stand for three hours in a dark closet. At the end of this time, darken the room, add 10 cc. of 10 per cent potassium iodide solution, shake, and titrate rapidly with 0.1 normal standard sodium thiosulphate, using starch paste as an indicator. As soon as the first end-point has been noted, add 10 cc. of 1 per cent potassium iodate solution, and titrate rapidly to the second end-point with thiosulphate. The titration of a blank run under similar conditions gives the thiosulphate equivalent of the bromine added.

The method of calculation of the results is entirely similar to that used in the case of raw rubber, except that, to get total rubber, the rubber equivalent to combined sulphur is added to that determined by bromination.

RESULTS.

TABLE I—RUBBER HYDROCARBON BY ADDITION.

Sample.	Individual Runs, Per Cent.				Average Per Cent.
A	86.2	86.6	82.2	83.8	85.5
B	63.5	66.5	..	..	65.0
C	56.6	52.6	52.7	50.7	53.2
D	54.2	55.0	53.5	55.0	54.4
E	45.4	45.2	..	..	45.3
F	80.5	81.9	74.9	74.7	78.0

The final analyses are summarized in Table II.

TABLE II.

Sample.	Acetone Extract, Per Cent.	Nature of Compounding Material.	Combined Sulphur, Per Cent.	Equivalent of Combined Sulphur, Per Cent.	Uncombined Rubber (by Bromination) Per Cent.	Total Rubber (by Analysis), Per Cent.	Total Rubber Known Composition, Per Cent.	Error in Total Rubber Hydrocarbon, Per Cent.
A	3.46	None	3.4	7.2	85.5	92.7	93.7	—1.05
B	1.90	Litharge	3.1	6.6	65.0	71.6	75	—3.4
C	2.33	Zinc oxide	3.3	7.0	53.2	60.2	60	+0.2
D	2.33	Sublimed lead	1.6	3.5	54.4	57.9	60	—2.1
E	...	Zinc oxide and organic accelerator	1.1	2.4	45.3	47.7	48	—0.4
F	...	Mineral rubber and accelerator	2.16	4.6	78.0	82.6	80.5	+2.1

Table II compares the percentages of total rubber hydrocarbon as found by analysis with the known figures for rubber content supplied by the compounders of the samples. In no case did the analyst have any information as to the composition of the samples. The analytical figures average low, as they should do, because of the resin and protein content of the raw rubber. The analytical results are, however, probably high for true rubber hydrocarbon, because any sulphur combining with resin, protein, or accelerator to give a product insoluble in acetone but soluble in tetrachlorethane is figured over to its equivalent of rubber, and, further, any sulphur substituting in rubber hydrocarbon itself will increase the results. These factors are probably negligible, except for sulphur combined with artificial accelerators. Any unsaturated organic material insoluble in acetone but dissolved by tetrachlorethane will also increase the analytical results. This is probably a cause of the high figures in the presence of mineral rubber. Few compounding materials are sufficiently unsaturated, however, to be serious in this regard.

It is believed that this procedure is by far the simplest and most accurate direct estimation of the rubber content of vulcanized articles. It should prove especially useful in the evaluation of shoddies, because it shows the extent to which the unsaturation of the rubber has disappeared, due to previous vulcanizations.

Within the experimental error, the results prove that rubber hydrocarbon is unsaturated to an amount equivalent to four atoms of bromine for each $C_{10}H_{16}$, and further that "combined" sulphur reduces this unsaturation by two bromine atoms for each sulphur combined. These facts seem incompatible with any theory other than that the sulphur taken up by rubber on vulcanization is chemically combined.

[4] In case "factice" (vulcanized oil) is present, it should be removed by treatment in the usual manner by extraction with alcoholic potash. This treatment was unnecessary for the samples used.

£5,000 IN PRIZES FOR NEW USES OF RUBBER.

THE Rubber Growers' Association, Inc., offers the following awards for ideas and suggestions for extending the present uses or for encouraging new uses of rubber: one prize of £1,000; three prizes of £500 each; ten prizes of £100 each; a sum not exceeding £1,500 to be divided among the remaining competitors whose suggestions are considered to be of value, according to the relative value of their suggestions, but so that no competitor will receive more than £100.

Suggestions must be practical and likely to increase the demand for the raw material. Ideas will be welcomed for the application in new directions of existing processes, methods or manufactures, or for improvements or new processes which will facilitate or cheapen the production of rubber goods.

Competent judges (technical and otherwise) will be appointed to investigate and adjudicate upon the suggestions received.

All competitors must accept the following conditions:

CONDITIONS.

1. Special value will be attached to suggestions of a thoroughly practical nature, supported by reasons and detailed information likely to make them effective.

2. The relative value of suggestions which are deemed practical will depend upon the quantity of raw rubber their adoption would absorb, and special consideration will be given to practical suggestions likely to utilize rubber in *large* quantities.

3. No apparatus, method or process suggested is to be protected in any country by letters patent or otherwise by the competitor or the Rubber Growers' Association. Every successful competitor must be prepared, if requested by the Rubber Growers' Association, to make a statutory declaration (at the expense of the Association) that he has not made and does not intend to make, and that to the best of his knowledge and belief, except as disclosed by him in compliance with clause 5 (*f*) of these conditions, no other person has made or intends to make, any application for letters patent (or like protection) in respect of the method, apparatus, or process suggested by the competitor, and that, to the best of his knowledge and belief, the method, apparatus or process suggested is not the property of any person other than the competitor.

4. The Council reserves the right at any time to publish, test, and otherwise deal with suggestions made by any competitor, whether he receives a prize or not, in any manner which is thought likely to stimulate the demand for raw rubber, and all competitors shall be deemed to have authorized such publication, testing or dealing with as the case may be.

5. Each suggestion to bear a *nom de plume* or number, which should be placed upon the right hand corner of each page used. Particulars should be clearly and legibly written or typewritten on one side of the paper only.

In submitting suggestions competitors shall give the following particulars, with such others as they deem advisable:

(*a*) A short preliminary description of the suggestion.

(*b*) As full a detailed description as possible should follow, with explanations, samples (if any), diagrams and designs to enable the suggestions to be fully adjudicated upon by the judges and, if necessary, adopted by a manufacturer.

(*c*) The facts upon which the competitor bases his belief in the value and practicability of the idea, and his special means of knowledge (if any).

(*d*) Any information the competitor may have as to: (1) The cost of manufacture of the article; (2) the possible demand for it; (3) the quantities of raw rubber likely to be utilized in its manufacture.

(*e*) Whether the suggestion has been already adopted partially or wholly and by whom and when and with what results.
(*f*) Whether the suggestion is, in the competitor's knowledge, in any way covered by patent laws, or has been the subject of any application for letters patent by any person, or is in any way affected by any letters patent, etc., in any country.

6. The decision of the judge or judges shall be final and binding on all competitors and will be communicated direct to all the competitors.
7. In the event of the judges considering two or more suggestions to be of equal merit, or in the event of a disagreement between the judges, power is reserved to divide the prizes.
8. Suggestions must be accompanied by a sealed envelope bearing outside the *nom de plume* or number, and inside the real name and address of the competitor. Names of prize winners only will be published.
9. All competitors shall be bound by the conditions governing this competition.
10. The closing date for receiving suggestions from competitors is December 31, 1920. Envelopes will not be opened before this date.
11. Suggestions should be addressed to: The Rubber Growers' Association Prize Competition, care of Messrs. Fitzpatrick, Graham & Co., Chartered Accountants, 95a, Chancery Lane, London, W. C. 2.

N. B.—All inquiries in connection with the competition (other than the competitive suggestions) should be addressed to The Rubber Growers' Association (Dept. C), 38, Eastcheap, London, E. C. 3.

PEACHEY'S NEW VULCANIZATION PROCESS.[1]

By S. J. Peachey, M. Sc. Tech, F. I. C.

THE VULCANIZATION of rubber is effected at the present time by one of two methods, the hot cure, which is extensively employed in the production of the great majority of rubber goods, and the cold cure, which finds application mainly in the manufacture of thin sheet rubber goods, dipped articles and rubber proofed fabrics.

The first method consists in mixing the rubber with a certain proportion of sulphur, and heating the compound to a temperature of 130 to 150 degrees C. for a period of time, which varies with the amount of sulphur employed, and averages perhaps one to three hours.

The second process was discovered by Parkes. Its application in the industry is limited by the fact that it produces a mere surface vulcanization, and can therefore be employed only for thin rubber sheets or surfaces.

From the time of Parkes' discovery of the sulphur chloride process in 1846—three-quarters of a century ago—nothing in the nature of a chemically new method of vulcanization had been brought forward until the year 1918, when the process forming the subject matter of British Patent No. 129,826 was discovered by the writer, as the result of an investigation on the behavior of rubber towards the various allotropic forms of sulphur.

Briefly the new process consists in exposing rubber, alone or in admixture with practically any useful filling agent or pigment, successively to the action of two gases, sulphur dioxide and hydrogen sulphide. The gases diffuse into the rubber and there interacting produce a particularly active form of sulphur, which is capable of combining with and vulcanizing the rubber, even at the ordinary temperature. The reaction presumably takes place according to the equation:

$$2H_2S + SO_2 = 2H_2O + 3S.$$

Unlike the Parkes process, which yields an addition product containing both sulphur and chlorine, the new process leads to the formation, without the aid of the heat, of a sulphur addition product, comparable in every way with that produced by the hot vulcanization process.

The process is applicable not only to rubber in its ordinary form, that is to say, as an elastic or plastic solid, but also to dissolved rubber. The treatment of a rubber solution alternately with the two gases mentioned above brings about complete pectization of the solution to a jelly consisting of vulcanized rubber distributed through the solvent. On expelling the latter by evaporation a fully vulcanized rubber of excellent quality is obtained.

The new process, eliminating as it does the use of heat and of sulphur chloride, renders it possible to introduce into the rubber a large selection of coal tar dyestuffs and lakes, and even natural coloring matters such as chlorophyll, and to produce vulcanized rubbers possessing pure and delicate shades of color quite unobtainable under the old conditions. Further, organic filling agents, such as leather waste, sawdust, wood meal, and the like, which are decomposed or partly decomposed at the temperature employed in the hot vulcanization process, or by the action of sulphur chloride in Parkes' process, can be introduced by the new method into rubber mixings, yielding cheap vulcanized products possessing new properties and a high degree of durability.

In this manner, for example, employing wood meal and a small proportion of rubber, it becomes possible to produce a new and very cheap class of material to replace linoleum and other floor coverings, with distinctly superior qualities as regards color, durability and flexibility. Similarly, by incorporating leather waste (buffings or shavings) with a comparatively small amount of rubber, and vulcanizing by the new process, it becomes a simple matter to manufacture a reformed leather closely resembling the real article in appearance and character, and possessing even greater durability. The process lends itself to the manufacture, not only of hard-wearing leathers suitable for boot and shoe manufacture, but also of delicately tinted and grained leathers for upholstery and artistic work. Further, by the application of the new solution process, the reformed leather may be built up into any desired article, the seams united by vulcanization, and stitching and riveting wholly dispensed with. In regard to cost, the new process compares very favorably with the existing processes, in that it dispenses with the use of steam and of mechanical pressure, and employs in the place of sulphur and sulphur chloride two gases which can be prepared and manipulated on a large scale at a very cheap rate. The main drawback is the objectionable smell of the gases, but the writer is assured by expert rubber engineers that this presents no difficulty in the application of the process.

[1] "The India-Rubber Journal," London, England, June 19, 1920, pages 23-24.

(*Goodyear News Service.*)

TREE SURGERY IS PRACTICED ON THE GOODYEAR 20,000 ACRE PLANTATION IN SUMATRA. A NATIVE TREE SURGEON IS HERE SHOWN OPERATING ON A HEVEA BRASILIENSIS.

THE "EVERREADY" PRODUCTS—EVERREADY SOLID WOVEN ASBESTOS brake lining and EverReady solid woven asbestos clutch facings are claimed to be especially satisfactory, due to the care bestowed upon their manufacture under the direction of experts. (Kelso Manufacturing Co., Trenton, New Jersey.)

What the Rubber Chemists Are Doing.

THE ACCELERATION OF VULCANIZATION.[1]

THREE METHODS are available for speeding up the vulcanization process: (1) raising the temperature, (2) increasing the proportion of sulphur relative to rubber, (3) introducing an accelerator.

EFFECT OF TEMPERATURE.

The effect of alteration of temperature is similar to that for other chemical reactions, the temperature coefficient being between 2 and 3 (for 10 degrees C.). The suggestion has been made that some accelerators, lead oxide in particular, are not genuine catalysts, but that they merely react with part of the sulphur with evolution of heat, thereby raising the temperature of the reacting mass above that of the surrounding heating medium.[2] The insufficiency of this explanation is evident from the fact that such an effect should be almost negligible at the surface of the rubber in contact with the molds, while in the interior it would be marked; thick slabs also would vulcanize much more rapidly than thin sheets; both these consequences of the theory are contrary to experience. It is quite possible, however, that many vulcanization accelerators do exert a slight thermal effect in addition to their purely catalytic influence.

The curves given in Fig. 1 represent results of some of our experiments as to the rate of vulcanization at temperatures ranging from 138 degrees C. (35 pounds' steam pressure) to 168 degrees C. (95 pounds) for a mixture of pale crêpe rubber (90) and sulphur (10). Pale crêpe rubber was chosen as showing greater uniformity in rate of vulcanization than other forms of rubber, and was taken as far as possible from one case. For the introduction of the sulphur a stock mixing of sulphur with approximately an equal weight of rubber was used. The composition of this mixture was checked by analysis, and the correct proportion weighed out for mixing with the remainder of the rubber. In this way the almost inevitable loss of sulphur dust during the customary method of mixing was avoided.

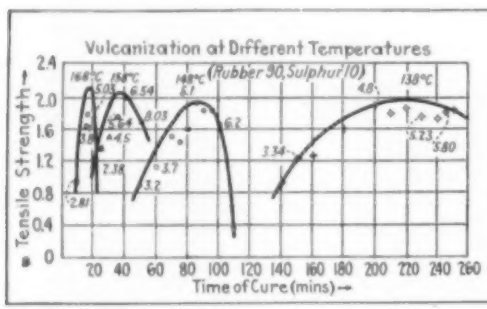


FIG. 1.

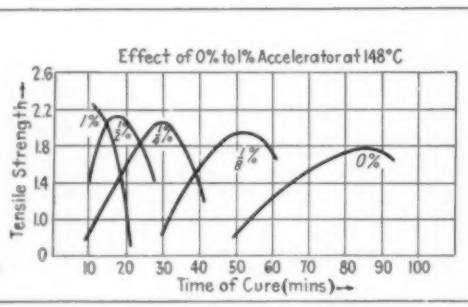


FIG. 2.

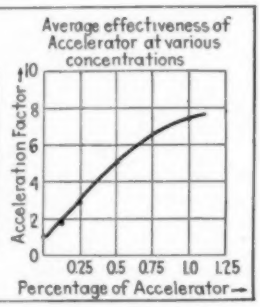


FIG. 3.

The progress of vulcanization may be followed in at least three different ways: (a) by the combination of sulphur; (b) by the gradual decrease in the extensibility of the rubber at a definite load (or increase of the load necessary to produce a definite elongation); within the range of the experiments in this paper, this shows a roughly rectilinear relationship with the period of vulcanization. Unfortunately, this method is influenced to a greater extent than either (a) or (c) by the mechanical treatment of the rubber during mastication and the subsequent mixing operation, increased working or heating having a tendency to exaggerate the extensibility figure. The approximation of the curve to a straight line and the close proximity of extensibility values for duplicate samples are evidence of the considerable degree of accuracy attainable with careful working. For the purpose of comparison between different samples an elongation of 600 per cent (including the original length) at a load of 0.5-kilo per square mm. has been arbitrarily assumed as a standard throughout this paper; (c) by the time required to produce maximum tensile strength.

The last method, although of less importance than might be expected in technical practice, is of considerable value in experimental work as supplying a convenient and rapid method for comparing rates of vulcanization, for example, of different rubbers or at different temperatures, the maximum tensile strength, determined within three days of vulcanization, being observed with a product containing approximately 5 per cent of combined sulphur calculated on the rubber. The actual value of the breaking strength of a rubber test piece is always more or less fortuitous; however, as vulcanization beyond the condition necessary for the attainment of the maximum strength causes a very rapid weakening, the position of the maximum is relatively easily determined. The peaked curves in Fig. 1 indicate the position of the maximum rather than the actual magnitude of the values.

It will be observed that the temperature coefficient manifests no tendency to any regular increase or decrease with rise of temperature, the mean value calculated (by all three methods of comparison) from the figures represented in the curves for the rubber-sulphur mixture at 128 degrees to 168 degrees C. approximating to 2.3[3]. This appears to indicate that the allotropic forms ordinarily present in molten sulphur in relative proportions dependent on the temperature, must possess equal or at least comparable vulcanizing activity.[4]

The extent to which the vulcanization period in technical work can be reduced by raising the temperature is limited by various considerations, not the least of which is the poor thermal conductivity of rubber and the consequent danger of unequal heating, involving local irregularities in the degree of vulcanization.

INCREASE OF PROPORTION OF SULPHUR.

Many old compounding ingredients and specifics of the rubber trade, often bearing fanciful names, contained—undeclared—considerable proportions of free sulphur; mixtures of sulphur with various waxes and also with antimony sulphide may be quoted as

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[1] By D. F. Twiss and S. A. Brazier, "Journal of the Society of Chemical Industry," May 15, 1920, page 125-132T.

[2] Seidl, *"Gummi-Zeitung,"* 1911, 25, 710, 748.

[3] On account of the inconveniently rapid progress of vulcanization at 168 degrees C. and its slowness at 128 degrees C. the measurements at 138 degrees C. to 158 degrees C. are possibly to be preferred; a mean value of 2.6 is then obtained for the temperature coefficient.

[4] See Twiss, Annual Report of the Society of Chemical Industry, 1919, 4, page 327.

better class examples. As the rate of vulcanization of rubber-sulphur mixings containing less than, roughly, 10 per cent of free sulphur is directly proportional to the percentage of free sulphur, the effect of such additional sulphur-containing ingredients on the rate of vulcanization is obvious, and today is commonly realized.

For experimental work on the relative rates of vulcanization of different rubbers or on the effect of various catalysts, the selection of a mixture of rubber and sulphur containing as much as 10 per cent of the latter is advisable, not only because this quantity is more than sufficient to permit the progress of the change to well beyond the characteristic maximum strength, but also because it is sufficiently high to reduce in extent any disturbance arising from slight inaccuracies in the proportion of sulphur present. The possibility must always be borne in mind, however, that the activity of an accelerator may possibly be influenced by the proportion of free sulphur simultaneously present.

USE OF A CATALYST.

Almost all basic substances can act as catalysts to the vulcanization process, for example, magnesium oxide, lead oxide, lime, sodium hydroxide, potassium hydroxide, and also substances such as sodium amide, potassium glyceroxide and sodium phenoxide, which, by interaction with the traces of water invariably present in rubber, are able to give rise to alkalis or bases; typical examples of organic accelerators are piperdine, quinine (the crude alkaloid mixture known as "quinoidine" is commonly used) aniline, naphthylamine, *p*-phenylenediamine, hexamethylenetetramine, anhydroformaldehydeaniline, benzylidineaniline, aldehyde-ammonia, and simple carbon bisulphide or carbon dioxide derivatives of the amines, such as dimethylammonium dimethylcarbamate, the corresponding dimethyldithiocarbamate and thiocarbanilide. Compounds containing a nitroso-group substituted into an aromatic cyclic nucleus are also effective catalysts, the best known example being *p*-nitrosodimethylaniline. Clearly there is a wide range of possible accelerators of these various types.[5] In this connection there must also be mentioned the possibility of forming catalysts in rubber during its production. If the wet rubber clot, freshly coagulated from the latex, is kept for several days before being rolled and washed, partial decomposition of the nitrogenous constituents of the retained serum sets in with the formation of organic bases. These are not eliminated by the subsequent rolling and washing, so that the resulting rubber exhibits exceptionally rapid vulcanization.

As is illustrated clearly by our results in Fig. 1, the curve representing the rate of combination of rubber and sulphur does not follow the course expected from a simple chemical reaction, but, with less than 10 per cent. of free sulphur, is approximately rectilinear until the almost complete exhaustion of the sulphur.[6] This is probably to be explained by the occurrence of autocatalysis; with mixtures of rubber and sulphur containing more than 10 per cent of the latter, the progress of the fixation of sulphur follows the sinuous S course, which is commonly regarded as characteristic of an autocatalytic process.[7] In the presence of an artificial catalyst, therefore, the compensation relation between the effect of the disappearance of sulphur and the extent of the increasing catalytic effect may be disturbed, so that the fixation of sulphur no longer follows a rectilinear course.[8]

Although the results as to the rate of vulcanization of a simple sulphur mixing, as decided by these three methods, are comparable, in the presence of an extraneous catalyst, this is not necessarily so. The chemical action of sulphur on the rubber induces the physical alterations which constitute the advantage to be gained by vulcanization, but the chemical and physical processes are not necessarily strictly proportionate, and some "accelerators" influence one more than the other. In the presence of certain accelerators the physical or mechanical alteration is disproportionately rapid, and the tensile strength attains its maximum[9] at a coefficient of vulcanization (combined sulphur × 100 ÷ rubber) well below the normal value of 5 (see table below).

Other accelerators, on the other hand, reduce the sharpness of the optimum, so that the peak of the curve is less pronounced. In yet other cases the catalyst may give rise to a vulcanized rubber with an abnormal extensibility relative to its coefficient of vulcanization. Most of them, but not all, by reducing the time of heating necessary, cause the production of a rubber with a higher tensile strength than would be obtained by more tardy vulcanization at the same temperature without the catalyst, and in this direction reduction of the time of vulcanization by using an increased percentage of sulphur can have a similar effect.[10]

The effectiveness of one of the above-named organic catalysts, namely, aldehyde-ammonia, is demonstrated with a mixture of pale crêpe and sulphur (90: 10), at various temperatures from 148 degrees C. (51 pounds' steam pressure) downwards, in an oil bath vulcanizer. Even at a concentration of ⅛ per cent the effect is clearly observable while, with 1 per cent, vulcanization occurs so readily as to be possible in a reasonable period at 108 degrees C. (or less than 5 pounds' steam pressure); the progress of vulcanization has been recorded at 98 degrees C. It will be seen that the temperature coefficient calculated by the ratio of the speed of reaction at intervals of 10 degrees C. from 108 degrees to 148 degrees is practically the same as for the reaction in the absence of an artificial catalyst; the average value for the accelerated mixings being 2.4. This observation militates against the belief of some investigators in this field that vulcanization catalysts are not themselves able to expedite vulcanization, but that during the early stages of the process they combine with sulphur, giving rise to substances which possess the desired activity. This view may be correct in certain cases, but evidently cannot be accepted generally for all vulcanization catalysts. The average values of the coefficient with the various proportions of accelerator are given in the table:

AVERAGE TEMPERATURE COEFFICIENT.

Proportion of accelerator.	1% (108°-148° C.)	½% (118°-148° C.)	¼% (118°-148° C.)	⅛% (118°-148° C.)	Nil (128°-168° C.)
Method of testing—					
(a) Combination with sulphur	2.4	2.3	2.4	2.3	2.3
(b) Elongation at 0.5 kilo, per sq. mm..	2.5	2.5	2.5	2.4	2.3
(c) Maximum tensile strength	2.5	2.5	2.2	2.5	2.4

It is a striking fact that although the individual values of the temperature coefficient between 108 degrees and 148 degrees C. without exception oscillate closely about the mean value of 2.4, the interval 98 degrees—108 degrees C. shows a much greater value exceeding 5.0. This is doubtless due to the melting of the sulphur between these two latter temperatures, the normal melting point being lowered under the obtaining conditions. This observation supplies a confirmation of the argument as to the comparable effectiveness of the various allotropic forms.

The fact observed above, that the temperature coefficient pos-

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[5]The presence of nitrogen in all such organic catalysts of vulcanization aids their detection in rubber. The organic accelerator to a considerable extent will pass into solution on prolonged extraction with acetone and the extract consequently will show an abnormally high percentage of nitrogen.

[6]Spence and Young, "Journal of the Society of Chemical Industry," 1911, 817; 1912, 81, 785.

[7]Skellon, Rubber Industry, 1914, 172; van Iterson, "Communications of the Netherland Government Institute for Advising the Rubber Trade and the Rubber Industry," 1916, 7, 247.

[8]van Iterson, *loc. cit.*

[9]This does not refer to the so-called "technical optimum" of vulcanization for which the corresponding coefficient of vulcanization in the presence of a catalyst may fall as low as 2 or 1. (Kratz and Flower, "Journal of Industrial and Engineering Chemistry," 1919, 11, 30.) The technical optimum cure is probably capable of less definite measurement than the maximum tensile strength in the type of mixing used above.

[10]van Rossem, *loc. cit.*, p. 210.

sesses comparable values for mixings with and without an artificial catalyst, appears from other results in our possession to be a general one for all catalysts. This facilitates the representation of the relative effectiveness of different catalysts by means of a numerical factor. A factor representing the ratio of the respective periods of vulcanization required for the attainment of a definite state of vulcanization in a rubber-sulphur mixing, with and without a definite proportion of accelerator, will be independent of the temperature; it will be essential that this comparison be made at a stage of the vulcanization process when the mixture still contains a considerable proportion of uncombined sulphur. The resulting "acceleration factor" may differ according to which of the three possible criteria—percentage of combined sulphur, maximum tensile strength and extensibility at definite load—is taken as fixing a definite state of vulcanization. In the case of the accelerator used in the experiments now quoted, the behavior may be described as normal, all three methods giving comparable results. The effectiveness calculated in this way for the accelerator at various concentrations and at different temperatures is given in the following table; the figures in each case represent the mean of the values obtained by the three different methods for the comparison of rate of vulcanization.

Stated otherwise, the presence of 1/8, 1/4, 1/2 and 1 per cent, respectively, of the accelerator increases the rate of vulcanization at any ordinary vulcanizing temperature to 1.7, 3, 5 and 7½ times the normal.

ACCELERATION FACTOR.

Percentage / Temperature C.	1/8	1/4	1/2	1
118-128 degrees	1.7	2.8	5.1	7.5
128-138 "	1.7	3.0	5.4	7.6
138-148 "	1.7	3.0	4.8	7.1

A graphic representation of this result as to the relation between the proportion of the accelerator in question and the effect produced is given in Figure 3. The slight divergency from the course of the smooth curve of the points for the lower percentages is doubtless due to the relatively greater effect of the inevitable small loss of accelerator by vaporization during the mixing operation.

Comparison of the relative effectiveness of isomeric substances, namely *m*- and *p*-phenylenediamine as accelerators shows that the meta-compound is notably less active than its para-isomeride. It is of interest to note that the effectiveness of these two substances towards vulcanization falls in the same order as their affinity constants as determined by Bredig in 1894. The low value of the coefficient of vulcanization at the maximum tensile strength of the *p*-phenylenediamine will also be noticed.

The "acceleration factor" for *m*-phenylenediamine, calculated from the results in Fig. 3, has a mean value of approximately 1.5; for *p*-phenylenediamine judged by the physical methods the factor is approximately 3.3, whereas the rate of combination with sulphur indicates a value of only 3.0.

MIXED CATALYSTS.

The effectiveness of a mixture of catalysts in an ordinary chemical reaction is well known not to coincide invariably with the sum of the effects produced by each independently. This peculiarity is also observable with vulcanization catalysts.[11] Lead oxide with magnesium oxide, and *p*-nitrosodimethylaniline with aniline or one of its homologs, are cases which have already been quoted in the literature. A related phenomenon probably is also the power of zinc oxide, which alone does not accelerate vulcanization, to increase considerably the effectiveness of other organic catalysts such as hexamethylenetetramine and thiocarbanilide. As the latter by itself is practically inert, we have the interesting case of a mixture of two inactive substances exerting a distinct accelerating effect. In other cases we have found two vulcanization catalysts to be "incompatible" in the sense that the effectiveness of the more active catalyst is actually decreased by the presence of the other.

As has been intimated already, no acceptable general explanation is yet possible as to the mode of action of vulcanization catalysts. In addition to the theories already mentioned, others have also been proposed. An observation of considerable interest in this connection is that rubber in solution or wetted with benzene becomes vulcanized by successive treatment with sulphur dioxide and hydrogen sulphide at the ordinary temperature.[12] This reaction appears to be very suggestive in connection with the action of vulcanization catalysts. None of the three modifications, S^{λ}, S^{μ}, and S^{π} present in liquid sulphur appears to be in possession of exceptional chemical activity towards rubber (see above), but there is evidently a possibility that there is capable of existence yet another form of sulphur of much greater vulcanizing power. Such a view, needing considerable modification however, has already been tendered[13] but the scope for investigation in this direction is enormous; indeed, the evidence available as yet is insufficient even to exclude the possibility that vulcanization accelerators may activate the rubber and not the sulphur.

CHEMICAL PATENTS.

UNITED STATES.

METHOD OF COLORING FIBROUS MATERIAL.—The process of coloring and rubberizing fibrous material, which comprises dipping the material into a solution of potassium antimonyl tartrate and a solution of a sulphide of ammonium, whereby antimony sulphide is formed directly in or upon the fibers of said material, and coating the material with a vulcanizable plastic compound. (Willis A. Gibbons, Flushing, New York, assignor to American Rubber Co., Boston, Massachusetts. United States patent No. 1,332,982.)

ARTIFICIAL RUBBER.—An elastic composition comprising glycerin, two and one-fourth pounds; glue, five and five-eighths pounds; water, nine pounds; tannic acid, two and one-fourth ounces; and a solution of formaldehyde, four ounces. (Ernest E. Cathcart, Tecumseh, Nebraska. United States patent No. 1,335,657.)

PROCESS FOR VULCANIZING RUBBER AND PRODUCT OBTAINED THEREBY.—A process for treating rubber or similar material which comprises adding thereto a dye, a vulcanizing agent normally tending to injure the coloring material under vulcanizing conditions and an agent itself having no injurious effect upon the coloring material and adapted to prevent injury by said vulcanizing material and inducing vulcanization to take place. (Iwan Ostromislensky, Petrograd, Russia, assignor, by mesne assignments, to New York Belting & Packing Co., New York. United States patent No. 1,342,457.)

PROCESS FOR VULCANIZING RUBBER AND PRODUCT OBTAINED THEREBY.—A process for treating rubber or similar material, which comprises subjecting the rubber to the action of sulphur and an organic vulcanizing agent containing oxygen and inducing vulcanization to take place under the action thereof. (Iwan Ostromislensky, Petrograd, Russia, assignor, by mesne assignments, to New York Belting & Packing Co., New York. United States patent No. 1,342,458.)

RUBBER VULCANIZATION AND THE PRODUCT.—The process of accelerating the vulcanization of rubber, which consists in vulcanizing the rubber in the presence of a compound of the amine bases produced from beet sugar residue combined with carbon disulphide. (Stuart Benton Molony, Wellesley Hills, Mass., assignor to Michigan Chemical Co., Michigan. United States patent No. 1,343,224.)

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[11] Ditmar, *"Gummi-Zeitung,"* 1915, *29*, 424.

[12] Peachey, "Journal of the Society of Chemical Industry," 1919, 688A.

[13] Dubosc, THE INDIA RUBBER WORLD, 1918, November 1, 78; 1919, February 1, 248.

THE DOMINION OF CANADA.

ART OF VULCANIZING CAOUTCHOUC. The process of effecting the curing of rubber which consists in first bringing together under reacting conditions sulphur and paranitroso-dimethylaniline in the presence of an excess of aniline to produce a sulphur nitrogen accelerator, and subsequently incorporating the latter in the caoutchouc mix and vulcanizing it.

The process of effecting the curing of rubber which consists in first bringing together under reacting conditions sulphur and thiocarbanilide or derivative thereof to produce a sulphur nitrogen accelerator, and subsequently incorporating the latter in the caoutchouc mix and vulcanizing it.

The process of effecting the curing of rubber which consists in first bringing together under reacting conditions sulphur and proteids or nitrogenous derivatives thereof to produce a sulphur nitrogen accelerator, and subsequently incorporating the latter in the caoutchouc mix and vulcanizing it. (The Goodyear Tire & Rubber Co., assignee of Clayton Wing Bedford, both of Akron, Ohio, U. S. A. Canadian patent No. 201,277.)

THE UNITED KINGDOM.

BOTTLE AND LIKE CAPSULES. A solution of the chlorine derivative of india rubber known as "duroprene" is first applied to the bottle or other article, and then a medium which will cause the duroprene to precipitate is applied, any remaining solvent and precipitam being afterwards allowed to evaporate. The duroprene may be dissolved in benzene or other solvent, and the neck of the corked or stoppered bottle dipped into the solution and afterwards into methylated spirit or other precipitant. (A. Lamble and United Alkali Co., Cunard Building, Liverpool. British patent No. 141,220.)

COLORING AND VULCANIZING INDIA RUBBER. The color bases of the basic synthetic organic dyes are mixed with natural or artificial caoutchouc or caoutchouc-like substances and sulphur, and the product is vulcanized under heat. These color bases act either as accelerators or as coloring agents, or both. In an example 57 parts of rubber are mixed with 40 parts of zinc oxide, three parts of sulphur, and one part of the color base of the basic dye auramine-O. Other dyes mentioned, of which the color bases are used, are: methyl violet B, methylene blue, Bismarck brown, magenta, rhodamine B, benzoflavine, safranine, Meldola's blue, thionine blue, thioflavine T. (L. Gaisman, Spring Bank House, Woodley, Stockport, Cheshire, and J. L. Rosenbaum, 11 Trafalgar Square, Ashton-under-Lyne. British patent No. 141,412.)

THE FRENCH REPUBLIC.

RECLAIMING RUBBER.—Improvements in process for reclaiming rubber. (Xylos Rubber Co., Limited. French patent No. 503,661.)

GERMANY.

INCREASING ELASTICITY OF VULCANIZED ARTIFICIAL RUBBERS.—(Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen, near Köln am Rhein. German patent No. 301,757.)

PROCESS OF MANUFACTURING PLASTIC RUBBER-LIKE MASSES.—The liquor which settles out in the saponification of resins is purified by sedimentation or filtration, then treated in a stirring vessel with dilute sulphuric or hydrochloric acid in a finely-divided state, while heating at about 100 degrees C. The resulting mass is slightly acid, insoluble in water, soluble in alcohol, ether, and caustic alkali; it is plastic when warm and brittle in the cold. (P. B. Ribot, Schwabach. German patent No. 315,847.)

PLASTIC COMPOSITION.—Formation of rubber-like masses out of cellulose waste by adding emollients. (Franz Clouth, Rheinische Gummiwarenfabrik, Köln-Nippes. German patent No. 324,944.)

DENMARK.

ARTIFICIAL RUBBER.—Resin is melted, especially the balsam and refuse resin, with addition of calcium chloride, and the mixture is distilled with continued addition of calcium chloride and calcium chlorate, and the rubber-like mass is mixed with rubber or rubber regenerates freed from factice, tar or the like, and then vulcanized. (F. de la Rosée. Danish patent No. 24,565.)

HOLLAND.

ARTIFICIAL RUBBER.—Stearate of aluminum, manganese, chromium or iron is dissolved in hydrocarbon and introduced into linoleum at 200-300 degrees C. (Ali-Cohen, Dutch patent No. 3,293.)

NORWAY.

TREATING VULCANIZABLE PLASTIC MATERIALS.—Consisting of admixing the vulcanizing agent and subjecting the combination to vacuum. (Rubber Regenerating Co. Norwegian patent No. 29,803.)

LABORATORY APPARATUS.

DIAL GAGE FOR SHEET RUBBER.

A MODIFIED form of the customary upright dial gage for sheet rubber is shown in the illustration. The pressure of the disk on the stock is regulated by removable weights on a spindle, instead of by a spring. This feature gives the instrument adaptability in gaging soft stocks and for that reason the gage is finding favor with rubber manufacturers. (B. C. Ames & Co., Waltham, Massachusetts.)

RUBBER THICKNESS GAGE.

LABORATORY DISH.

A standardized weighing dish for laboratory purposes has lately been perfected and made the subject of a recent patent. The method of standardization follows:

A standard weight is decided upon for the dish which may be selected by averaging the weight of a number of dishes. Each dish is then very carefully and accurately weighed with the equalizer attached. If the dish is found to be above the standard weight previously selected, the cap of the equalizer stud is ground to remove sufficient metal to bring the weight of the dish exactly to the standard selected. If the weight of the dish is below this standard the cap is removed from the stud and powdered lead placed in the container in sufficient quantity to bring the weight to the standard selected. (Mojonnier Bros. & Co., Chicago, Illinois.)

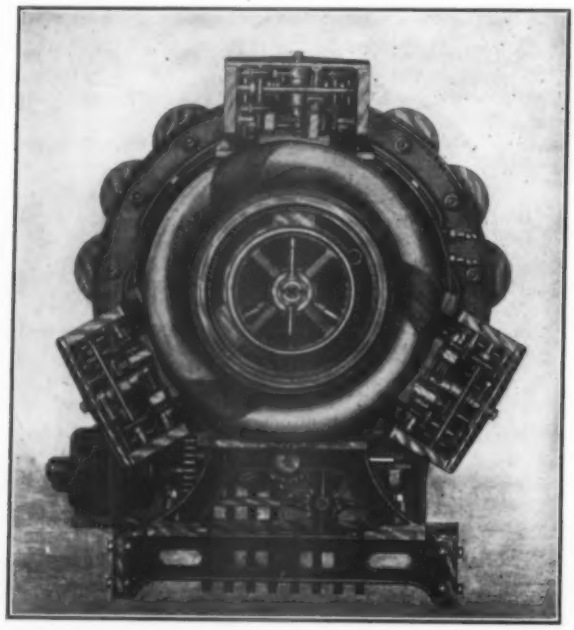
STANDARDIZED WEIGHING DISH.

"CRUDE RUBBER AND COMPOUNDING INGREDIENTS" AND "RUBBER MACHINERY," by Henry C. Pearson, should be in the library of every progressive rubber man.

New Machines and Appliances.

AUTOMATIC CORD TIRE BUILDING MACHINE.

DUE to the novel method employed in carcass construction, the production capacity of this machine, it is claimed, will average 25 tires per hour. Moreover, the construction permits the saving of materials that are wasted in ordinary cord tire building processes. The specifications for the tire provide for individual cords tensioned to absolute uniformity throughout the process of twisting the separate strands comprising the cabled cord and in the final cabling thereof. The individual strands are



THE DICKINSON TIRE BUILDER.

thoroughly impregnated with rubber compound that precludes frictional movement within the body of the cords.

The cords are laid on the core in a series of strips made up of a number of parallel cords formed in cross-section to compensate for the variable circumference between the bead and crown, and uniformly covering the full superficial area. The strip-cords are equally distributed on helicoidal lines representing the shortest path between the opposite beads in accord with the angle at which the cords are laid, so that each cord occupies the same relative angular position and bears its full proportion of the stresses and strains of service.

To form the cord strips that give the progressive increased width from bead to crown, the contour of the cord varies from cylindrical to elliptical, but the displacement is accomplished without rupture of the fibers and the original strength is not impaired. All cords are insulated to prevent frictional contact between them in the separate plies and between the cord plies themselves. To eliminate multiple frictional surfaces two plies only are used, as more plies increase the cross-sectional circumference between the first and succeeding plies, amplify frictional action and impose strains on the cords in attempting to meet the constantly changing conditions in the flexing of the tire in service.

The machine is practically automatic in operation, as the operator has only to do with starting, stopping, supplying the necessary material, setting the cores in place and removing them with the finished carcass thereon. The present type machine lays fifteen cords simultaneously in units of five cords each at three points over the core, one hundred and twenty degrees apart, the cords being fed from fifteen reels or bobbins through tensioning apparatus, imparting to each cord a fixed stretch or tension, automatically controlled to insure uniformity. Each unit of five cords is carried through a forming die in which pressure is applied throughout the strip length to obtain the required progressive shape to cover the variable area between bead and crown.

From the die the strip is fed to a swinging arm having grips at each end by which the strips are held under fixed tension. In this position the strip is cut to a predetermined length, in which there is no further trimming, thus obviating waste material. The arm is then swung over the core in position to lay the cord strip at the desired angle over the core. The cord strip is next transferred to laying fingers which carry each end in its path around the core; this path being mechanically regulated, there can be no deviation from it; therefore, each strip occupies the same relative position and the initial tension of the cord has been maintained throughout. Placing the bead then follows, after which the strip ends are brought around the bead toe and under it, the ends presenting a line parallel to the bead toe and heel, midway between them.

Laying the second ply is accomplished in the same manner as the first, the strip ends being laid under the bead heel, abutting the ends of the first ply and parallel thereto, thus providing angular locks, under mold pressure, preventing any slippage of the cords whereby the tension is relieved. (Dickinson Cord Tire Corporation, 250 West 54th street, New York City.)

RUBBER BUFFING MACHINE.

Flexible shaft buffing equipment has come into use more recently in tire factories through its utility in removing small imperfections in finished tires, and for eradicating the name and serial number from defective tires.

In tire rebuilding and repairing, these machines are in-

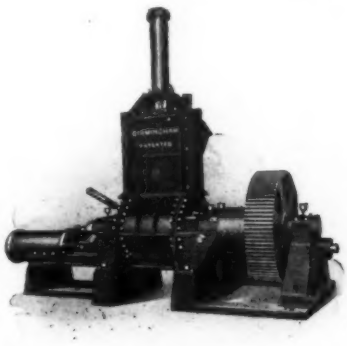
FLEXIBLE SHAFT BUFFER.

valuable for buffing the inside of the casing to prepare it for the reliner or inside repair. For repairing giant pneumatic tires, buffing tubes, and tool grinding, this portable device is of much practical use.

The machine here shown is furnished complete with a ¼-h.-p. motor, 10 feet of cord with plug to attach to the electric lighting socket, five feet of 7/16-inch flexible shafting, grinding wheel, and felt buff. (R. G. Haskins Co., 27 South Desplaines street, Chicago, Illinois.)

IMPROVED AUTOMATIC MILL AND MIXER.

Enclosed, automatic rubber mixers are now accepted as standard equipment in rubber mills. The machine here shown has demonstrated its efficiency in breaking down crude rubber and mixing compounds maximum quantities.



No. 9 BANBURY MIXER.

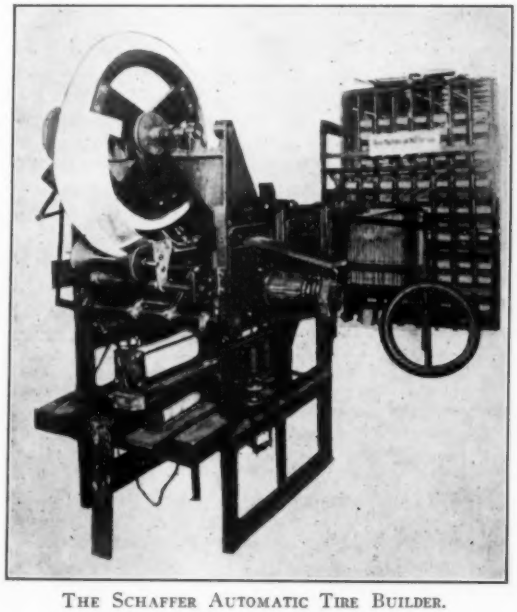
. The mixer consists of an enclosed trough, in which operate rotating blades of special construction, both trough and blades being hollowed for cooling and heating purposes. The rubber and compounding ingredients are fed into a hopper and the finished batch is discharged by the turn of a valve, through the door at the bottom of the machine.

A recording thermometer records the temperature of the mix and also shows how many batches are mixed daily, and a timing device indicates by sight or sound when the batch is finished.

These mixers are made in two sizes, No. 3 and No. 9. The former will handle a batch of approximately 150 pounds of 1.5 gravity stock, and the latter, 450 pounds. Individual motor drive is commonly used but the machines may be driven from the mill line. (Birmingham Iron Foundry, Derby, Connecticut.)

COMBINED TIRE BUILDING MACHINE AND LOOM.

This machine makes it possible to begin the construction of a tire carcass on the doubling and twisting machine, where each thread, before becoming a part of a cord, is drawn through



THE SCHAFFER AUTOMATIC TIRE BUILDER.

rubber solution and impregnated, insuring a thorough distribution of rubber throughout the fabric, thus contributing largely to the elimination of one of the troubles that usually cause separation of the plies, internal friction and blow-outs.

After being rubberized, the threads are ingeniously woven on a magnetically operated loom and formed into a fabric on a double curve to approximate closely the final position of the fabric in the tire, as regards curve of the walls and circumference of the tire.

The saturated threads are then passed over electrically warmed pads that make them soft and sticky, when the skim-coat rubber is fed between the rolls and adheres to the warmed rubber of the plies, welding them closely together and insuring the expulsion of air.

The carcass made by this machine is unique in that it does away with all laps or joints. There is one continuous ply from start to finish, in which the distribution of warp threads may be regulated to give varying strengths for first ply, bead section, etc. The fabric contains one starting and one finishing end, with no waste of fabric, there is no trimming, and but little auxiliary stitching.

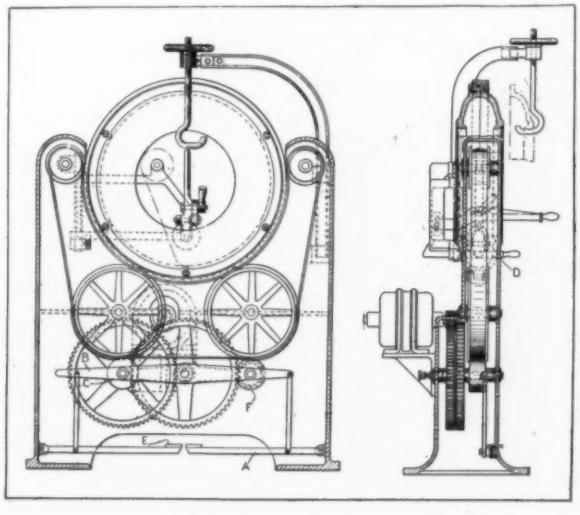
These machines will make tires up to 34 by 4 inches, with a capacity of two tires per hour, it being assumed that one man will be able to take care of eight machines and thus turn out sixteen tires per hour. (Automatic Tire Machine Corporation, Buffalo, New York.)

MACHINERY PATENTS.

MACHINE FOR BUILDING CASINGS AND TUBES.

THIS machine is provided with a rotatable annular channel-shaped form within which the tire casing or tube is built. Two annular portions secured together and arranged to be separated after the tire is built permit the removal of the tire from the form; a stitching device stretches the material from which the casings are formed, as it is placed within the form and shapes the tire casing.

The tread portion and side walls of the casing are first placed



BANNER TIRE BUILDER.

within the form after which the breaker strip is placed upon the tread or if desired the breaker strip may be applied to the tread before placing in the form. The form is preferably operated at a slow speed by depressing the treadle *A*, rocking the lever *B* into position to move friction roller *C* into engagement with the belt, and thus slowly rotating the form.

The fabric or cord is then placed within the form, and the stitching wheel *D* operated to press the fabric within the side walls and tread portion of the tire. The cushion strip being

placed in the form, the inner plies of cord or fabric are then stitched upon the inner surface of the tire.

If it is desired to operate the form at a comparatively fast rate of speed, the treadle *E* is depressed, moving the friction roller *C* out of engagement with the belt and throwing the friction roller *F* into engagement with the belt.

These inner cords or fabric may be composed of any desired number of layers according to the size or type of tire to be built, The beads are then placed in their proper position and the remainder of the cord or fabric plies placed over the beads and stitched in place by the stitching wheel.

After the tire is thus built up the form is separated and the tire removed and finished by vulcanization in the usual manner. (William R. Major and Frank H. Grove, assignors to the Banner Machine Co., Columbiana, Ohio, United States patent No. 1,343,399.)

OTHER MACHINERY PATENTS.

THE UNITED STATES.

NO. 1,342,646. Rubber core tensioning mechanism for braiding machines. F. W. Plumb, assignor of Narrow Fabric Co. —both of Wyomissing, Pa.

1,342,916. Repair vulcanizer. S. Kenchen, New Haven, Conn.

1,342,970. Last for rubber boots. R. B. Price, New York City, assignor to The Goodyear's Metallic Rubber Shoe Co., Naugatuck, Conn.

1,343,121. Flexible coupling for adjacent ends of shafts. W. J. Francke, assignor to The Francke Co.—both of Highland Park, N. J.

1,343,377. Apparatus for treating vulcanizable rubber in sheets to reduce shrinkage. J. J. Shea, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.

1,343,413. Flexible coupling device with interposed floating ring, etc. R. A. Smith, Mahwah, and J. J. Sorrell, Elizabeth, assignors to Smith & Sorrell, Mahwah, a copartnership—all in New Jersey.

1,343,425. Mold for mechanical goods. C. P. Whisler, assignor to The Miller Rubber Co.—both of Akron, O.

1,343,460. Apparatus for opening tire molds, etc. Colin Macbeth, Birmingham, assignor to the Dunlop Rubber Co., Limited, Westminster—both in England.

1,343,504. Collapaible core for tires. A. H. Harris, Barberton, O.

1,344,313. Expanding core for tires. O. A. Peterson and O. M. Brancel, Minneapolis, Minn.

1,344,702. Mandrel for making inner tubes for pneumatic tires. F. R. McCarty, Erie, Pa.

1,344,838. Tire repair tool. C. Wieland, Yankton, S. D.

1,344,847. Repair vulcanizer for tire side walls. J. W. Arthur, assignor to The Williams Foundry & Machine Co.—both of Akron, O.

REISSUES.

14,879. Apparatus for manufacturing tires or inner liners. W. F. Ray, Chicago, Ill. (Original No. 1,292,052, dated January 21, 1919.)

THE DOMINION OF CANADA.

200,584. Device for securing couplings to flexible hose. J. R. Ruse, Spencer, W. Va., U. S. A.

200,666. Expansible core for tires. E. A. Krannich, Chicago Heights, Ill., and L. A. Andregg, Mansfield, O., each an assignee of ½ interest, both in the U. S. A.

200,687. Apparatus to resole rubber boots. J. Anctil and J. O. Landry, coinventors, both of Montreal, Que.

200,860. Tire vulcanizing press. The Dunlop Rubber Co., Limited, Westminster, County of London, assignee of Colin Macbeth and H. Willshaw, Birmingham, County of Warwick—all in England.

200,863. Apparatus for vulcanizing tires. Firestone Tire & Rubber Co., assignee of C. A. Myers—both of Akron, O.

201,157. Repair vulcanizer. E. Fetter, Baltimore, Md., U. S. A.

201,259. Pneumatic shoe press. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of C. J. Stuart, New Haven, Conn.

201,463. Machine for making pneumatic tire covers or casings. The Dunlop Rubber Co., Limited, Westminster, County of London, assignee of Colin Macbeth and C. K. Jones, Birmingham, County of Warwick—all in England.

THE UNITED KINGDOM.

138,915. Apparatus for treating rubber for removal of moisture. Hunter Dry Kiln Co., 2571 Cornell avenue, assignee of H. Hunter, 2802 Ashland avenue—both of Indianapolis, Ind., U. S. A. (Not yet accepted.)

141,210. Apparatus for recovering volatile solvents, especially in the rubber industry. D. V. Plumbridge, Holmewood, South Kilworth, near Rugby, Warwickshire.

141,421. Apparatus for drilling, turning, or analogously treating studs for pneumatic tires, etc. B. Clews, 37A, Agamemnon Road, West Hampstead, and H. M. Petersen, 46 King's Road, Willesden Green—both in London.

142,368. Apparatus for making pneumatic tires. E. Hopkinson, 1790 Broadway, New York City, U. S. A.

GERMANY.

324,972. Apparatus to cut out rubber heels, soles, and strips for shoes and other rubber articles. Wood-Milne, Limited, Gaythorn, Manchester, England.

PROCESS PATENTS.

THE UNITED STATES.

NO. 1,344,503. Manufacture of composite soles for boots or shoes, having cord fabric incorporated therein, with ends of cords presented to wearing surface. J. E. Grosjean, Lima, assignor by direct and mesne assignment of ¼ each to L. F. Montgomery, Fort Recovery, and F. L. Maire, Lima—all in Ohio.

MACHINES FOR VARNISHING AND VULCANIZING AUTO TOP FABRICS.

In the manufacture of auto top fabrics the success of the final varnishing and curing processes is largely dependent on certain machines of special design and construction.

Double texture fabric is not varnished and is not sticky and when ready to be cured, the festooning machine shown in Fig. 1 is utilized. This is shifted in front of the vulcanizer and two rolls of double-texture fabric are placed in the machine which delivers the sheets, one upon the other, in festoons into the heater.

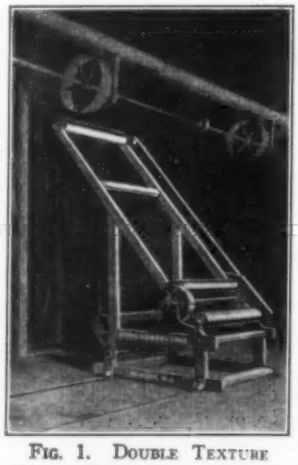


FIG. 1. DOUBLE TEXTURE FABRIC FESTOONING MACHINE.

Single texture fabrics are first calendered or coated on a spreader and then varnished and cured, the two latter operations being performed on the apparatus shown in Fig. 2. This machine takes the fabric from the roll, varnishes it and delivers it into the heater in festoons of single sheets. (Cyrus Currier & Sons, Newark, New Jersey.)

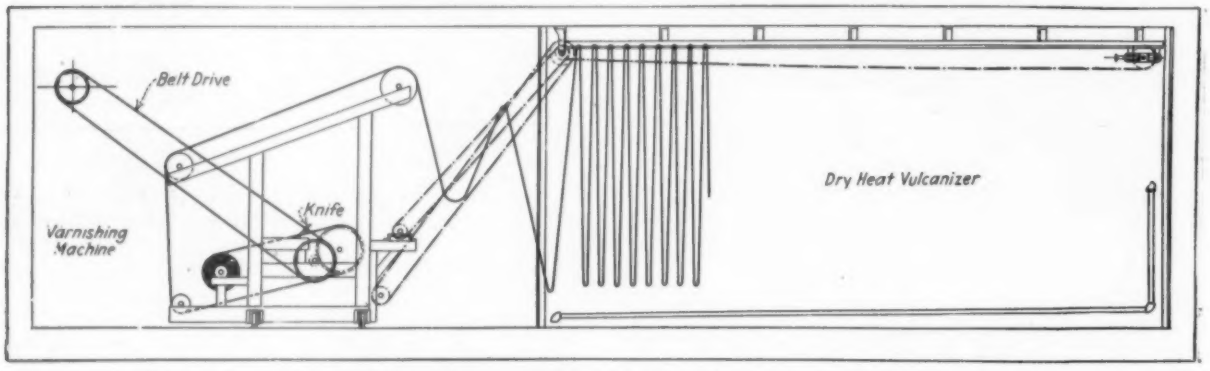


FIG. 2. SINGLE TEXTURE FABRIC VARNISHING AND FESTOONING MACHINE AND DRY HEAT VULCANIZER.

New Goods and Specialties.

LATE AUTOMOBILE FAN BELTS.

THE DEVELOPMENT of the automobile business has apparently resulted in multiplying the number of accessories on the market, and many of these employ rubber in some form in their composition or construction. The automobile fan belt often is in this class and two of the late types are illustrated herewith. The upper one is the newer of the two and is an endless V-belt made like a cord tire, molded to fit the pulley, thereby minimizing the tendency to slip. The cross-sectional view shows the construction of this belt, which is made in standard sizes to fit passenger cars, trucks, or tractors.

"VULCO-CORD" V-FAN-BELT.

The picture below shows a magnified view of a section of a bias-woven fan belt. Being woven on the bias makes it elastic and gives it a firm grip on the fan pulley, assuring the user of its always remaining tight. This belt is made under a United States patent granted to Charles C. Gates, the inventor, for what is known as the "Vulco-Cord" process. (Gates Rubber Co., Denver, Colorado.)

"VULCO-CORD" BIAS BELT.

THE "EVERLOC" HOUSEHOLD PATCH.

A patch that will mend the ordinary articles of fabric, leather, or rubber, such as rubber shoes, automobile tops or tires, footballs, umbrellas, etc., is called the "Everloc." In addition, there is a cobbler kit containing self-vulcanizing patch material in a strip. (Everloc Sales Co., Minneapolis, Minnesota.)

THE "BIG" AND THE "LITTLE" IN MOTOR TRUCK TIRES.

The big tire shown here is the "Samson," 40 by 12 inches, weight approximately 400 pounds, believed to be the largest solid motor truck tire ever made in Canada. The smaller one is a 3½-inch tire, shown for the sake of comparison. It is claimed that the 12-inch tire contains a greater proportionate volume of rubber than any other and that it is exempt from such troubles as splitting and coming loose from the steel base. Some idea of the tremendous undertaking involved in manufacturing a tire of this size can be gained from the fact that the mold equipment necessary to handle it weighs approximately two tons. While the manufacturer will continue to make the 6 and 7-inch dual tires, it is sure that better service is obtained from the use of single "Samsons," because what is practically combining the duals into one single broad tire offers greater cushioning and carrying capacity. The 12-inch "Samson" will carry a load of 10,000 pounds as against an 8,000-load for the 6-inch dual, while the 7-inch dual carries the same, 10,000 pounds. The company will next produce a 14-inch "Samson." (Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ontario, Canada.)

BIG AND LITTLE "SAMSONS."

GOGGLES TO GUARD AGAINST DUST AND POWDERS.

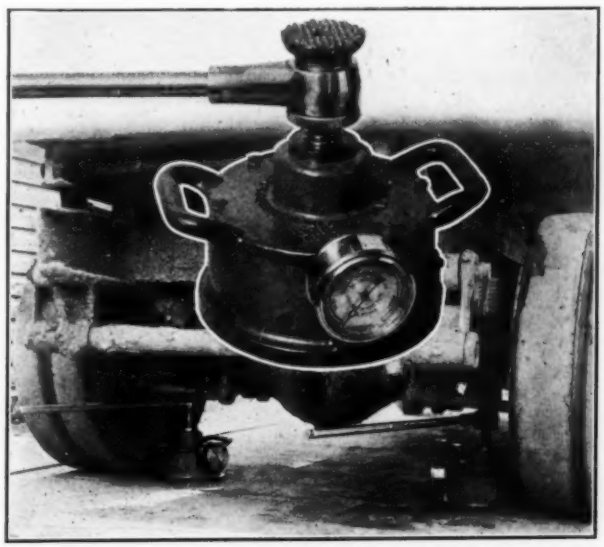
The King "Dustsafe" C goggle is designed to protect against dust and powders. The rigid aluminum cups are bound with rubber composition, as is also the connecting chain. The C. model has ventilating side ports and elastic straps for adjusting and fastening. (The F. W. King Optical Co., Cleveland, Ohio.)

THE KING "DUSTSAFE" C GOGGLE.

A METER TO MEASURE TRUCK LOADS.

To prevent overloading, with consequent damage to motor trucks, tires and especially to the highways, the Loadometer has been invented. It is a portable instrument having a screw jack mounted on its plunger. The base of the instrument is an oil-filled cylinder in which the plunger operates, and the weight carried by the plunger is indicated on a high-pressure gage connected to the oil chamber.

By placing a pair of Loadometers under the rear axle of a truck where the greatest weight is carried and jacking up the rear wheels clear of the ground, the maximum load per inch of tire width is easily determined. The jack handles can be readily detached from the instrument so that a pair of Loadometers can be easily carried about in a small automobile. County and state road commissioners are using these devices extensively to prevent abuse of improved roads. (The Black & Decker Manufacturing Co., Baltimore, Maryland.)



THE B. & D. LOADOMETER.

THE "SLAPATCH" FOR LARGE BLOW-OUTS, HAS LIVE RUBBER SELF-adhering surface which holds patch to inside of tire casing and double weight canvas back, while canvas flaps fit under rim. (The Wilson Rubber Co., Des Moines, Iowa.)

RUBBER BLOOMERS FOR CHILDREN.

The "Everychild" wading bloomer is a recent product on the market. It is made of good heavy rubber stock, in three fast colors—blue, red, and green, in three sizes—small, medium, and large, for children from three to ten years of age. Elastic is cemented within the hems at the waist and legs so that there is no bother with strings and buttons—something both children and mothers will appreciate. The garment is well shaped, being made in two pieces, with cemented seams, and is decidedly good looking, due to the excellent grade of rubber used in its manufacture. The "Everychild" bloomer may be slipped on over the child's clothes, thus forming a needed protection, whether in playing or wading. The child thus clothed may sit on the beach in the sand without danger of a wetting if a wave creeps up suddenly. One of the advantages of this bloomer is that it requires no washing except dipping in clear water. (Arthur Frankenstein & Co., 514-516 Broadway, New York City.)

"EVERYCHILD" RUBBER WADING BLOOMER.

"SUPER PATCH RUBBER-TITE" TUBE REPAIR OUTFIT.

An outfit for repairing inner tubes includes patches of high-grade, properly cured red rubber, to which is added a cloth protector, and a tube of cement, all contained in a small can with a screw-top. It is claimed for this patch that it cannot leak, will not creep, and stretches with the tube. (The Polson Rubber Co., Cleveland, Ohio.)

"WISCO" ATHLETIC SHOES.

The shoe shown here, intended for wear by basket-ball players, is made on the "Wisco Turnwelt" principle, which affords great flexibility and extremely light weight for a shoe of its kind. The uppers are of the finest black calf. The notable feature is the soft and pliable fiber-rubber vacuum suction-cup sole, which prevents slipping on a polished floor. The shoe protects the ankle and laces from the toe up. The sizes range from 5 to 11.

"WISCO" BASKET-BALL SHOE.

The indoor running shoe, also illustrated, has the best quality corrugated rubber tap sole, with light kangaroo horse uppers, cut under at the heel to secure a snug fit. The sizes run from 3 to 11. Both of these styles of athletic shoes are made by the same concern, and, like its other goods marked with the "Wisco" trademark, are guaranteed to give satisfaction and reasonable service when used for the purpose for which they are intended under the ordinary conditions and with fair treatment by the wearer. (Wisconsin Shoe Company, Milwaukee, Wisconsin.)

"WISCO" INDOOR TRACK SHOE.

THE "LOCKTITE" PATCHER.

Already a part of the standard equipment on a large number of cars, the "Locktite Auto-New-Matic" patcher seems to fill a long-felt need. Patching inner tubes by this method is claimed to be superior to ordinary ways of mending tubes on flat surfaces, as the tube is held and the edges of punctures, cuts, and blow-outs are prevented from curling under and wrinkling. An illustrated instruction sheet accompanies the device and gives simple directions. (Locktite Patch Co., Detroit, Michigan.)

"AUTO-NEW-MATIC" INNER TUBE PATCHER.

HICKORY GARTERS FOR CHILDREN.

The Hickory garter is made with a body of fine mercerized sateen with straps across the front and back to hold it in place, while the garters themselves are attached to the belt at the bottom of the body part. The garters have a patented rubber cushion loop which saves wear on hosiery, and the webbing and elastic are of excellent quality. (A. Stein & Co., New York City and Chicago.)

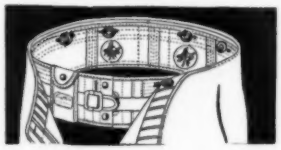
SKOOTER ON RUBBER-CUSHIONED TRUCKS.

The "Brownie" skooter for children has a strong 20-inch footboard mounted on four ball-bearing skate wheels carried on rubber-cushioned trucks, and is guided by a 24-inch handle conveniently placed. The toy is painted bright red and comes packed by the dozen in corrugated fiber cases. Extra parts, including the rubber cushions for the trucks, may be ordered separately, as needed. (F. D. Kees Manufacturing Co., Inc., Beatrice, Nebraska.)

"BROWNIE" SKOOTER.

TROUSER SUPPORTER UTILIZES RUBBER.

The Faust trouser supporter, made from 26 to 44 inches long and from 4 to 8 inches wide, fastens with flat buttons and reinforced buttonholes, while rubber "finger" pads hold the shirt down. The belt strap is adjustable and there is an invisible leather money-pocket. The wide sizes are designed especially for stout men. (Faust Manufacturing Co., Chicago, Illinois.)



FAUST TROUSER SUPPORTER.

THE "INKOGRAPH."

An ink pencil with a one-year guaranty is an article sure to

AN INK-PENCIL WITH RUBBER PLUG.

interest the many who rely upon pencils and fountain pens. Its points of superiority are as follows: (1) three or four carbon copies may be made at once; (2) lines may be drawn with a ruler without blotting and blurring; (3) the smooth, hard, round gold point will not break or bend; (4) it can be carried in any position without danger of leakage; (5) it is ready for instant use the moment the cap is taken off.

The "Inkograph" is made in many different styles, for a wide range of prices. The latest model has a rubber plug inside the cap which prevents leaking while upside down. (Inkograph Co., Inc., 670 Sixth avenue, New York City.)

CARPET WASHER WITH RUBBER BRUSHES.

A new washer for rugs and carpets is shown in the accompanying illustration, which makes it no longer necessary to remove them from the floor in order to have them perfectly clean and sanitary. The "Hamilton Beach" carpet washer is a combination of washing machine and vacuum cleaner, equipped with two rubber brushes that oscillate 500 times a minute, duplicating the action of the human hand perfectly, it is claimed, only in a more thorough manner. No water touches the rug or carpet, however. Only the warm, sudsy cleaning compound is scrubbed down to the bottom of the nap in so thorough a manner that every thread is cleaned. The dirt is removed by the powerful suction, simultaneously with all moisture. The soap compound intended to be used with this carpet washer is said to contain no harmful chemicals or animal fats, being based on a vegetable oil that leaves the carpet sweet-smelling and sanitary. (Hamilton Beach Carpet Washer Co., 114 Liberty street, New York.)

HAMILTON BEACH CARPET WASHER.

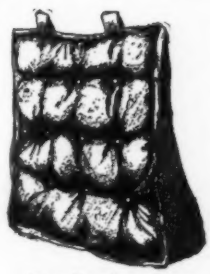
REPAIR TOOL FOR DIVERSE USES.

The Schrader "Universal Five-in-One" valve repair tool, it is claimed, performs three repair and two utility operations namely: (1) repairs the inside thread on valve and (2) the outside thread on valve stem for valve cap; (3) smooths down valve-cap washer seat on valve; (4) removes or inserts valve inside; (5) deflates tube by holding down valve inside, by screwing deflater into mouth of valve. These valve-repair tools are put up ten to a counter display board, with easel back for convenience in displaying. (A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York.)

SCHRADER VALVE TOOL.

THE "ALLWEATHER" AUTOMOBILE TOP.

A handsome custom built automobile top for individual cars is called the "Allweather." The frame is of hard wood, reinforced with sheet steel, padded with felt. The side panels are of clear glass set solidly into hard-wood frames covered with material to match the waterproof topping. The glass is held in place by a leak-proof rubber compound. The side panels may be removed, frame and all, for summer driving. Curtains with celluloid windows are provided as a substitute, and these may be folded and carried under the seat of the automobile. The curtains also match the top material. (The Allweather Top & Body Co., Inc., 6545 Carnegie avenue, Cleveland, Ohio.)



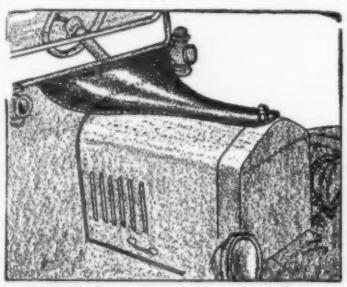
"EASY-REST" CUSHION.

PRACTICAL AUTOMOBILE ACCESSORIES.

An excellent wedge-shaped back cushion, for use by women automobile drivers or persons of small stature, is made of heavy 32-ounce rubberized fabric with a black enamel finish. It is stuffed with a high-grade sea moss which does not pack hard or get lumpy, because tufts are sewed in nine places with black upholstering buttons, to help preserve the shape. The maker claims that the "Easy-Rest" cushion shown in the illustration above retains its resiliency indefinitely.

The same manufacturer is putting out the "Wear-Ever" leather reliners for tires, prepared on regular tire forms, shaped to fit the inside curve of the casing. They are coated on one side with a heavy layer of rubber cement that is moistened with gasoline when applying the reliner to the tire casing.

Another specialty of this manufacturer is a rain guard to cover the crack between the hood cover and cowl on a Ford automobile. It is made of durable rubberized duck and prevents moisture running down to the wires. The back fastens under the wind shield with nickel-plated snaps and the front over the radiator top, while two straps hold the sides snugly. The guard is easily removed when not required for use. (A. J. Stephens Rubber Co., Kansas City, Missouri.)



"STEPHENS" RAIN GUARD FOR FORDS.

THE EDITOR'S BOOK TABLE.

"EXPORTER'S GAZETTEER OF FOREIGN MARKETS." 1920-1921. Compiled and edited by Lloyd R. Morris, editor of "The American Exporter," New York City. The Johnson Export Publishing Co., New York City. (Cloth, 6 by 9 inches, 766 pages.)

THIS BOOK is prepared with the object of providing in readily accessible form facts about the world's markets which may be used for reference by the American business man concerned with foreign trade.

The countries of the world are listed alphabetically by continents; units of currency, measurement, capacity and weight are converted into units commonly understood by Americans; maps of the different countries are provided, along with information regarding area, population, commerce, production, industry, railroads, telegraphs, telephones, money, weights, measures, commercial language, principal shipping routes, customs tariff, consular regulations and representation, cable rates, mail time, postal rates, regulations with respect to parcel post, money orders and reply coupons, and other statistics. Supplementary tables and a complete index are given at the close of the book.

NEW TRADE PUBLICATIONS.

THE CAMERON MACHINE CO., 57-61 POPLAR STREET, BROOKLYN, New York, is issuing to its friends neatly framed illustrations of the various types of slitting and rewinding machines, made by this company for the rubber trade; and also views, both exterior and interior, of its well-equipped plant in Brooklyn.

PORTABLE MACHINERY CO., PASSAIC, NEW JERSEY, HAS JUST PUBlished a 24-page catalog entitled, "Portable Conveyors," complete with illustrations showing the various uses of the scoop conveyor and other portable conveyors manufactured by this company. The catalog describes clearly the labor, time and money saving features of the machines in storing, reclaiming, loading and unloading material, such as coal, coke, ashes, sand, gravel, crushed stone, fertilizer, cement, chemical, etc.

THE RUSSELL MANUFACTURING CO., MIDDLETOWN, CONNECTIcut, issues a neat booklet describing the "Rusco" products. Since its organization in 1830 by the great-grandfather of the present president, the company has grown from one mill to thirty-eight, with a floor space of 450,000 square feet. Some of the goods manufactured to-day are: brake linings, cone and disk clutch facings, fan belts, tire straps, anti-squeak webbing and hand lacings.

THE "TWENTIETH YEAR BOOK AND ANNUAL REPORTS," OF THE Rubber Association of America, Inc., is just off the press. It was prepared by the general manager and secretary, and contains a list of the officers and committees of the association proper, and of the various divisions.

A membership list is included, along with photographs and other matters of interest to the members of The Rubber Association.

THE NATIONAL INDIA RUBBER CO.'S NEW FACTORY JOURNAL, "Keds Live Wire," the name embracing the shoe and wire departments, made its initial appearance at Bristol, Rhode Island, on Saturday, June 26, and was a very creditable and breezy paper. It is to be issued weekly on Thursday for distribution among the employes of the concern. Frank Damrosch, Jr., has been appointed editor; Francis J. McIsaac, sporting editor; John T. Ashton, photographer; Pietro Vaccaro, Italian translator, and Anthony Alfred, Portugese translator. There will be a reporter for each room and the paper will include all items of interest in and about the factory.

"CURRENT DIFFICULTIES IN DOMESTIC DISTRIBUTION" WAS THE subject of an important address by W. O. Rutherford, general sales manager of The B. F. Goodrich Rubber Co., Akron, Ohio, before one of the group meetings at the annual convention of the Chamber of Commerce of the United States at Atlantic City, New Jersey. In it he discussed the condition of American business, with pertinent comment and constructive suggestions regarding transportation by rail and motor truck, factory production, labor conditions, finances, individual and industrial economics and the circle of rising costs. Although money is the controlling factor in the situation, he concludes that we are suffering more from mental than financial instability and that there is nothing seriously wrong with the country.

INTERESTING LETTERS FROM OUR READERS.

FROM AN AGED FATHER.

TO THE EDITOR.

DEAR SIR:

I want to locate the address of my son, Alfred Dunn, who I am told, is a superintendent of a rubber company about 45 miles from San Francisco, California.

If you can give me any information how I can locate him, I will be much obliged.

I. R. DUNN.

Aged Men's Home,
51 Belmont street,
Toronto, Canada.

A DEFENSE OF THE FILIPINOS.

TO THE EDITOR:

DEAR SIR:—Allow me to make some comments upon your editorial of last month entitled "'A Setback to Filipino Progress."

While everybody is entitled to his own opinion, I do believe that it is not fair to state that the act of the Philippine Government in refusing to amend the laws that limit the extension of land that can be acquired by a company and that prohibiting the importation of Chinese laborers, is a crass folly; and it is the height of unfairness to say that this action shows the absolute incapacity of the Filipinos for self-government.

Similar laws are enforced in some states of the Union, among them California, and we doubt your readiness to brand these states as incapable for self-government. The Government of the United States is really responsible for the exclusion of Chinese laborers from the Philippine Islands. The laws limiting the extension of land that can be acquired by any corporation have been dictated by a wise sense of national protection and according to one of your own contributors, Lieutenant Colonel H. F. Cameron, of the Engineers Corps of the United States Army in an article published in the same issue where your editorial appears, "these laws were framed by an early American administration."

Furthermore, Colonel Cameron states that: "The Philippine Government has under serious consideration the necessary law changes to permit large responsible industrials to operate. Understanding the present situation as outlined above, it is believed that capital with faith and courage in the Philippine Government may take the maximum land area allowed by present laws and develop, using Filipino labor, with an assurance that amended laws will soon permit this operation to expand on as favorable a business basis as now pertains to the rubber-producing Dutch Netherlands and British Colonies of the Far East."

ARSENIO N. LUZ, Manager,
Philippine Commercial Agency.

Grand Central Palace,
New York City.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(811.) A correspondent desires to know the best commercial method of finding the percentage of lead hydrates and lead carbonates in ordinary white lead.

(812.) A correspondent wishes to know address of owner of patent on or manufacturer of a machine for forming rubber balls, toys, etc., before they go into the molds.

(813.) A request is made for the addresses of manufacturers of brass fittings for rubber bath and basin stoppers.

(814.) The name and address of the manufacturer of the "Sorelle" rubber heel is desired.

(815.) A correspondent wishes to obtain the names and addresses of the concerns making machines for the manufacture of small hose.

(816.) Directions for making a dipping solution for toy balloons are desired.

(817.) The name of the manufacturer of the Daisy milk bottle stopper is requested.

(818.) A foreign correspondent wishes address of reputable manufacturer who will make reservoir sacks for self-filling fountain-pens strictly according to specifications.

(819.) Inquiry is made by a foreign correspondent for the names of any firms manufacturing a machine for rolling finger cots.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(33,137.) A firm in South Africa desires to purchase machinery for the manufacture of tires and tubes. Quotations c. i. f. South African ports.

(33,149.) A trading company in Argentina desires the exclusive agency for the sale of rubber belting. Quotations by mail or cable c. i. f. Argentine port.

(33,170.) A company in Norway wishes an agency for the sale of rubber and rubber goods. Quotations c. i. f. Norwegian port. Payment through banks in Norway and New York.

(33,211.) A manufacturer's agent in Australia desires an agency for the sale of all kinds of rubber goods, except tires.

(33,218.) A company in Danzig desires exclusive agency for motor cars and cycles, as well as tires. Quotations c. i. f. Danzig in United States currency. Correspondence in German.

(33,224.) A firm of engineers and merchants in Wales wishes agency for sale of motor tires and rubber goods. Quotations c. i. f. English ports.

(33,254.) A commercial agent in Bulgaria wishes agency for sale of fine quality raincoats. Quotations c. i. f. port of Varna. Correspondence in French.

(33,255.) A commercial representative from Colombia who is now in the United States wishes to secure an agency for sale in Colombia of rubber goods.

(33,261.) A merchant in Norway desires to purchase five tons of washed Pará rubber. Quotations c. i. f. Bergen.

(33,277.) A surgical supply company in Canada wishes to purchase elastic webbing. Quotations f. o. b. shipping port. Cash payment.

(33,280.) A commercial agent in Italy wishes to secure representation of firm for sale of rubber goods. Correspondence may be in English.

(32,924.) A trading firm in Australia desires an agency for motor accessories. Quotations c. i. f. Australian port.

(32,927.) An import firm in Ceylon wishes to purchase motor cars and motor accessories. Quotations c. i. f. Ceylon.

(33,306.) A commercial agency firm in Brazil desires an agency for the sale of automobiles, supplies, and rubber goods. Quotations c. i. f. Brazilian ports and f. o. b. American ports. Correspondence may be in English.

A HAND-POWER STUMP PULLER

Clearing land for rubber planting involves the removal of stumps and therefore a stump puller that is already in use on rubber plantations in the Far East, will be of more than passing interest.

This hand-power puller, as its name indicates, is operated by hand with either one or two men, and its light weight makes it readily portable to any point where it may be needed. The simplicity of construction and operation is such that any one, even of the most ordinary intelligence, can use it with a few minutes' instruction. With a hundred pounds' pressure on the handle, the machine will develop a pull of 48 tons, which is more than two large tractors or one compound locomotive will develop. It can be carried into position by two men or wheeled about by one, and works equally well in the air or on the ground. (The Fitzpatrick Products Corporation, 99 John street, New York City.)

THE "K" POWER PULLER AT WORK.

RESISTANCE OF RUBBER OBTAINED BY COAGULATION OF LATEX.

By coagulating latex with sulphuric acid in the presence of phenol it is possible to obtain sheets of raw rubber of surprising strength and elasticity, the breaking strength being 190 grams per square milimeter and the permanent set small. After heating for 20 minutes at 100 degrees C. the extensibility and permanent set are greater but the breaking strength is unaffected; heating for 4 hours at 110 degrees C., however, causes the rubber to become very weak and plastic. If strips of the rubber are vulcanized in the sulphur bath at 135 to 140 degrees C., a very elastic product is obtained with a breaking strength of 666 grams per square milimeter.—V. Henri, in *"La Caoutchouc et la Gutta-Percha,"* 1920, 17, pages 10196-10202.

Summer Outing of The Rubber Association of America.

GEDNEY FARMS HOTEL, WHITE PLAINS, NEW YORK.

FAIR WEATHER greeted the three hundred and fifty rubber men and their guests on Wednesday, July 28, at Gedney Farms Hotel, near White Plains, New York, where the Nineteenth Annual Summer Outing of The Rubber Association of America was held.

Easily accessible from New York City by train or motor, Gedney Farms, with its comfortable modern hotel, beautiful country surroundings, and every facility for sport and recreation, is an ideal spot for a summer outing.

The members and guests commenced to arrive by train or motor as early as 10 o'clock and soon the hotel lobby was filled with a jolly crowd of rubber men who had forgotten business in a day's outing where good fellowship reigned supreme.

Among the first on the grounds were the golfers, who took possession of the 19-hole golf course and the club house, situated on a shady knoll not far from the hotel proper, and providing every comfort and convenience of a first-class country club. With clear skies and a cool breeze, the ball was driven from the first tee promptly on time and the golf tournament was on.

The contestants in the tennis tournament were on hand early, also, and occupied the excellent courts adjacent to the hotel. With an entry field of some 25 in the singles and 8 teams in the doubles the day was hardly long enough for the elimination contests in singles and doubles and the playing of the prize-winning finish.

Impromptu contests were soon in progress in the bowling alleys where picked teams representing rubber manufacturers and importers contended for the satisfaction of beating the other fellows.

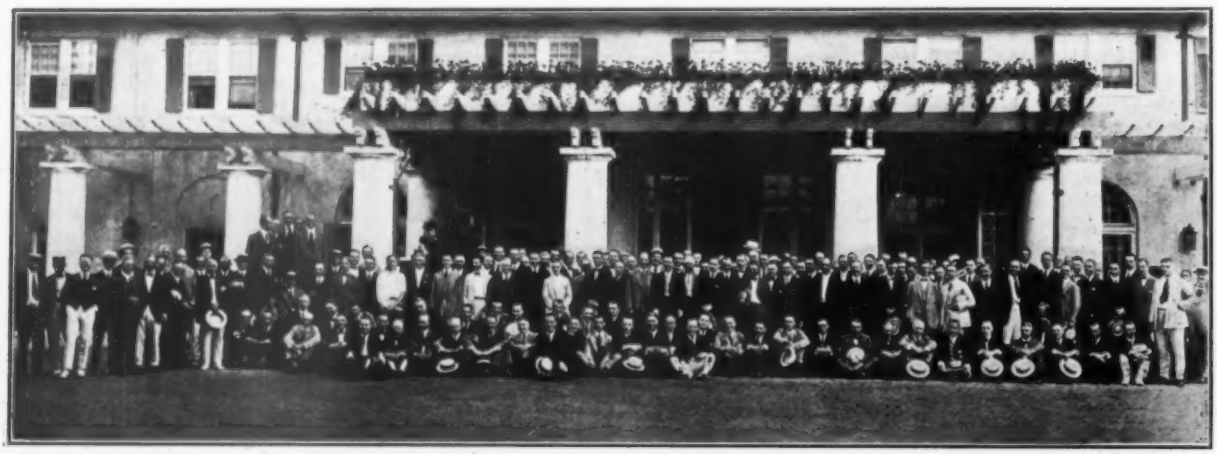
The knights of the cue took possession of the billiard room, where match games of billiards and pocket billiards afforded amusement for the devotees of these sports. The adviser-general was W. G. Kelly, of Poel & Kelly, credited with the invention of kelly pool.

During the heat of the day the swimming pool was well patronized by those aquatically inclined and in the afternoon a water polo match between picked teams afforded amusement for the players and interested spectators.

Between 1 and 2 p. m. an excellent luncheon was served in the hotel dining hall, accompanied by the latest music and popular songs, led by an efficient jazz band.

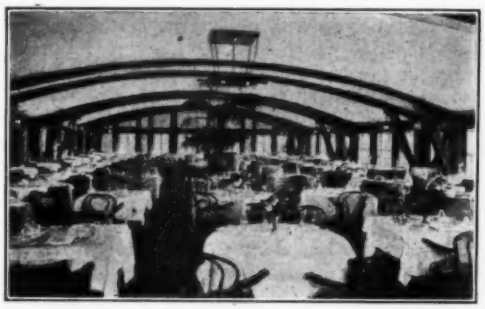
THE TENNIS TOURNAMENT.

In the inter-firm doubles, the plan of a team of players representing firm members was not followed and the players teamed up as they entered the courts. After the eliminations, the finals were played by the following teams: S. H. Johnson, of J. H. Lane & Co., and H. G. Smith, of the United States Rubber Co., vs. D. S. Kubie, of Raw Products Co., and H. P. Farrington, of Pennisular Trading Agency. The score was 6-3, 6-4, the former team winning the first prize, two gold-mounted leather pocket books, and the second prize, two silver-mounted belts, went to the latter team. E. H. Baker, of W. H. Bass & Co., won the ten-



MEMBERS AND GUESTS OF THE RUBBER ASSOCIATION AT THE SUMMER OUTING AT GEDNEY FARMS.

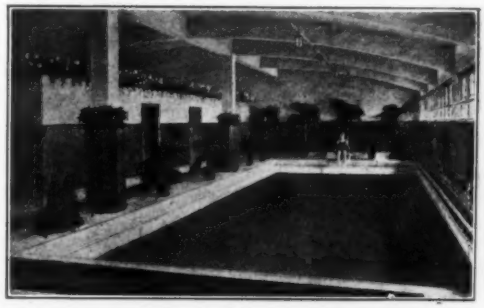
nis singles from H. G. Smith, of the United States Tire Co., score 6-3, 6-4, whereby Mr Baker won a leg on the perpetual challenge cup, donated by The Rubber Association, to be won



THE BANQUET HALL.

three times, and a gold-mounted pocketbook. The second prize, a silver-buckled belt, went to Mr. Smith.

Gross 93, handicap 20, net 73. E. H. Sprague, of the Sprague Tire & Rubber Co., Omaha, Neb., won two thermos bottles with the second low net score of 86 gross, 10 handicap, 76 net.



THE SWIMMING POOL.

In Class "B", A. D. Lown won a leather golf-bag with the low gross score of 103. The first low net prize, a smoking set, went

AEROVIEW OF GEDNEY FARMS.

THE GOLF TOURNAMENT.

The golf committee had arranged a handicap play golf tournament open only to members of the Association with prizes for the low gross, first low net, and second low net scores. The

to E. P. Gwillim; score 103 gross, 26 handicap, 77 net. H. Hardenburgh was the second low net man, scoring 103 gross, 23 handicap, 80 net, and won a dozen golf balls.

In the special contest for guests, a cocktail shaker, the prize

HOTEL LOBBY.

entries were divided into Class "A" and class "B", according to handicaps, two distinct contests for members being held.

In Class "A" the prize for the low gross score, a leather golf-bag, was won by G. G. Yule, of the Falls Rubber Co., Cuyahoga Falls, Ohio, with a score of 79. A mantel clock, the prize for the first low net score, was won by W. E. Kavenaugh, of the Plymouth Rubber Co., Canton, Mass., with the following score:

THE GOLF COURSE.

for the low net score was won by A. E. Betteridge, who scored 82 gross, 8 handicap, 74 net.

The putting was open to everyone and the first prize, a leather pocket cocktail case, went to F. A. Goddard, of the Sterling Tire Corporation, Rutherford, N. J. D. A. Paterson, of Balfour-Williamson & Co., and P. E. Young were tied for the second prize, a silk umbrella. Mr. Young won on the toss.

THE BASEBALL GAME.

An impromptu ball game was arranged between teams representing rubber manufacturers and rubber importers, umpired by

Overlooking the Tennis Courts.

H. W. Jenkins, of the New York Insulated Wire Co. The battery for the manufacturers was: Flint, pitcher, and Scranton, catcher. Utley and Millenthal pitched and Bouton caught for the importers. The score was 9 to 7 in favor of the manufacturers.

It was a tired and hungry, but happy, crowd that took places in the banquet hall for the final entertainment of the day. The menu was excellent, and the informal character of the dinner, accompanied by jazzy music and chorus singing, inspired a happy mood in everyone. The time for leaving came too soon and members and guests, after the usual friendly salutations, departed for home, while the orchestra played appropriate music in the Italian garden in front of the hotel.

The unqualified success of the outing was due to the efficient

The Hotel Tea Garden.

work of the outing committee: A. H. Brown, George A. Ludington and W. O. Neil; the sub-committee, A. H. Brown and R. L. Chipman for golf; and Roger S. Hardy and Harold French for tennis; and General Manager Viles and his competent assistants.

ACTIVITIES OF THE RUBBER ASSOCIATION OF AMERICA.

BULLETINS.

The subjects relating to industrial relations covered by bulletins sent to members of the association last month include: "Wages and Output," "Two Successful Profit Sharing Plans," "Women Workers in Five Major Industries," "Incompetence the Leading Cause in Business Failures," "Wage Increases in the United States and in Great Britain," and "A Successful Small Hospital Plan."

WAGES AND OUTPUT.

It is frequently asserted that to increase wages is a sure way to secure increased output. That there is a point at which even so strong an influence as a money incentive may not be able to overcome technical conditions in production—a point of diminishing returns beyond which increased wages do not result in proportional increased production—is usually not recognized. For this reason wage and output data obtained in the course of the National Industrial Conference Board's investigations of the hours of work problem are of interest. The Board found that increased wages did not, except in some cases, result in increased output, and that on the whole no definite relationship between wages and changes in output could be traced.

SMALL HOSPITAL PLAN.

That first aid hospital service is a success in a plant of three to four hundred employes, has been demonstrated by the Essex Rubber Co., of Trenton, New Jersey. The management states that, aside from the excellent medical assistance taken advantage of by the workers at the plant, the reduction in liability insurance premium for one year, as a result of installing this service, offset the cost of the equipment.

It is not the purpose to render any aid that should properly be subject to the attention of a physician, and it is necessary that this phase of the service should be in accordance with the State laws. An efficient nurse, and assistant, capable of administering first aid, keep closely in touch with the factory workers and report to the management each month—an example follows:

Report of First Aid Work for Month Ended June 30, 1920.

Medical Cases.

Headache	27
Cramps	6
Faintness	2
Indigestion	5
Toothache	2
Hives	2
Hysteria	1
Sore throat	2
Total	49

Classified According to Departments.

Press	4
Office	12
Vulcan	1
Power	4
Trimming	11
Heel packing	5
Specialty	3
Carpenter	1
Cutting	3
Stock weighing	4
Light work	1
Total	49

Surgical Cases.

Incised wounds	19
Punctured wounds	3
Slivers wounds	3
Abrasions wounds	16
Burns wounds	12
Eye conditions	10
Ear conditions	1
Infections	1
Blisters	4
Sprains	2
Dislocations	1
Contusions	3
Boil	2
Bee sting	1
Total	78

Classified According to Departments.

Mechanical	3
Mill	12
Inner tube	3
Power	2
Stock weighing	2
Machine shop	4
Yard	3
Press	8
Cutting	1
Specialty	7
Vulcan	8
Trimming	11
Shipping	4
Light work	4
Heel packing	5
Office	1
Total	78

Total cases, medical and surgical..... 127
Total treatments 152
Four accident insurance cases during the month included in the above.

Of the 114 calls made during June, 87 were for the purpose of investigation, 22 were sick and accident calls, and five were to request applicants to report. The 87 home calls revealed the following reasons for absence: personal illness, 26; personal business, 11; illness at home, 5; working elsewhere, 19; unsatisfactory excuses, 17; nobody home, 9.

Four of the applicants asked to report had taken other positions and only one reported to the Employment Office.

Hagemeyer & Brunn, 82 Beaver street, New York, an old and respected firm of crude rubber importers, were not able to meet their contracts last month and voluntarily requested the appointment of the following investigating committee: Edward Maurer, Edward Maurer & Co., Inc., chairman; William E. Bruyn, L. Littlejohn & Co., Inc.; A. H. Brown, Meyer & Brown, Inc.; C. R. Swaney, William J. Kelly, Poel & Kelly, and A. W. Stedman, Arthur W. Stedman, Inc., secretary of the committee.

News of the American Rubber Industry.

DIVIDENDS.

AMES-HOLDEN-MCCREADY, LIMITED, Montreal Quebec, Canada, declared its quarterly dividend of one and one-quarter per cent, payable July 2 on preferred stock of record June 21, 1920.

The Canadian-Connecticut Cotton Mills, Limited, New York City, and Sherbrooke, Quebec, Canada, has declared the following dividends: ten per cent on both A and B stock and an extra dividend of one-half of one per cent, all payable August 2 on stock of record July 15, 1920.

The Corn Products Refining Co., New York City, declared the regular quarterly dividend of $1 a share on common stock, payable July 20, and one and three-quarters per cent on preferred, payable July 15, besides an extra dividend of one-half of one per cent, all on stock of record July 6, 1920.

The Firestone Tire & Rubber Co., Akron, Ohio, declared the following quarterly dividends: $2 on common stock, payable June 20 on stock of record June 10, and one and one-half per cent on six per cent preferred stock, payable July 15 on stock of record July 1, 1920.

The General Tire & Rubber Co., Akron, Ohio, declared its quarterly dividend of one and three-quarters per cent on preferred stock of record June 20, payable July 1, 1920.

The Hood Rubber Co., Watertown, Massachusetts, has declared its quarterly dividend of one and three-quarters per cent, payable August 2 on preferred stock of record July 20, 1920.

The Kelly-Springfield Tire Co., New York City, has declared the following dividends: quarterly, $2 per share, payable August 16 on eight per cent preferred stock of record August 2; quarterly, cash, $1 per share, and quarterly, stock, three per cent, payable August 2 on common stock of record July 17, 1920.

The Manufactured Rubber Co., Philadelphia, Pennsylvania, declared its quarterly dividend of one and one-half per cent, payable July 7 on stock of record June 30, 1920.

The Meyer Rubber Co., Columbiana, Ohio, declared its quarterly dividend of two per cent, payable July 15 on outstanding preferred stock of record June 30, 1920.

The A. J. Stephens Rubber Co., Kansas City, Missouri, declared and paid its quarterly dividend on common stock July 1, 1920.

The Sterling Tire Corporation, Rutherford, New Jersey, has declared the following dividends: quarterly, one and three-quarters per cent outstanding seven per cent preferred stock; quarterly, two per cent on outstanding series B. preferred stock; and one per cent on outstanding common stock—all payable July 20 on stock of record July 6, 1920.

The Tyer Rubber Co., Andover, Massachusetts, declared its regular quarterly dividend of $1.50 per share, payable July 15, 1920, on common stock.

The United States Rubber Co., New York City, declared its regular quarterly dividends of $2 per share, payable July 31 on both common and first preferred stock of record July 15, 1920.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, declared dividends of two per cent on both preferred and common stock, payable July 15 and July 31, respectively, on stock of record June 30, 1920.

FINANCIAL NOTES.

The United States Rubber Company has sold Kuhn, Loeb & Co. $20,000,000 ten-year 7½ per cent notes, secured by $25,000,000 of 6 per cent bonds, issued under the company's first and refunding mortgage of January 2, 1917. Owing to the present time being unfavorable for long-term bonds it was in the interest of the company to borrow upon the bonds for a shorter period of time rather than to sell them under existing conditions. The bonds themselves run for thirty years from January 2, 1917. The proceeds, with the current surplus earnings, will give the company sufficient funds for the completion of the plant extensions now in progress at Detroit, Hartford, Providence and Indianapolis, for the increase of the company's tire production, which is far below the demand. The company does not contemplate any further financing and it is not expected that there will be another meeting of the board of directors before the middle of September

Lee Rubber & Tire Corporation sales for the first six months of 1920 were approximately $4,400,000 and net profits before taxes amounted to $500,000. Estimated sales for the year are placed at $8,500,000. Business is active, though June as usual was the low month of the year. Almost 50 per cent of Lee's sales are now of its puncture-proof cord tires.

Westinghouse Electric & Manufacturing Co. is again shipping orders at the annual rate of fully $160,000,000. The transportation congestion has been entirely relieved, and orders are now being shipped without delay. Orders at the parent plant during first quarter of the fiscal year, which began April 1, were approximately $41,000,000, against $16,000,000 in first quarter of the last fiscal year. Annual rate of bookings is thus over $160,000,000 for the parent plant alone, and for all plants is running well above $180,000,000.

The remarkable growth of the automobile industry the last four years, especially since the close of the war, is reflected in expanding production and growing prosperity of rubber companies.

Total sales of rubber tires in the United States this year will exceed $1,000,000,000. In 1916 they were less than $500,000,000. In the current year approximately 40,000,000 tires will be produced, compared with 18,500,000 in 1916. In addition, millions of dollars' worth of rubber footwear, clothing and mechanical goods will be turned out.

The following tabulation from the Boston News Bureau, of four leading rubber companies, shows net profits after taxes per share on common, dividends paid on common, and net sales for 1916 and 1919 and estimates for 1920:

	Net Profits After Taxes	Per Share on Common	Divs. Paid on Common	Net Salee
U. S. Rubber:				
*1920	$23,000,000	$22.00	a$8.00	$300,000,000
1919	17,730,237	17.59	b2.00	225,589,465
1916	10,302,195	15.12	.....	126,759,129
Goodyear:				
*1920	‡30,000,000	c42.00	b12.00	225,000,000
1919	‡23,277,245	98.58	12.00	108,914,982
1916	7,003,330	35.65	e12.00	63,950,000
Goodrich:				
*1920	‡18,000,000	30.00	6.00	210,000,000
1919	†17,304,813	25.09	4.00	141,343,419
1916	9,568,764	12.75	4.00	70,990,782
Kelly-Springfield:				
*1920	2,500,000	9.00	g4.00	†.....
1919	2,422,522	9.82	h4.00	†.....
1916	1,908,819	8.62	3.75	†.....

*Estimated annual rate.
aStock dividend of 12½ per cent declared January.
bCommon dividends at $8 annual rate resumed October, 1919.
‡Before federal taxes.
cOn basis of common capitalization after giving effect to 150 per cent stock dividend declared June, 1920.
dAlso 150 per cent stock dividend.
eAlso 100 per cent stock dividend.
gCurrent dividends are at annual rate of $4 a share cash and 12 per cent stock.
hAlso 9 per cent stock dividend.
†Not available.

United States Rubber Co. is the largest producer of rubber footwear in the world. It ranks second in production of tires. Large demand for rubber footwear which will accrue this fall, when dealers replace stocks depleted by last winter's severe

weather, and the steadily increasing output of tires resulting from operation of new plants nearing completion, should bring sales this year close to $300,000,000, a $75,000,000 increase over last year and two and one-half times business in 1916. After almost four years of no dividends on the common, disbursements at annual rate of $8 a share were resumed last October. As a further reward to junior shareholders a stock dividend of 12½ per cent was declared in January. It is not unlikely that another stock distribution will be made before the end of this year.

Goodyear Tire & Rubber Co. expects to earn $30,000,000 before federal taxes this year. This would be equivalent to about $42 a share on 618,900 shares of common which will be outstanding on conclusion of present financing and payment of 150 per cent stock dividend declared last month. The company has been paying common dividends at annual rate of $12 a share in cash since 1900. In the same period 450 per cent in stock dividends has been distributed.

The B. F. Goodrich Co. will do a business this year approximately three times greater than in 1916 and net profits before federal taxes, estimated to reach $18,000,000, will be almost double 1916 net of $9,568,764. Although the company was obliged to do some financing recently, issuing $30,000,000 five-year 7 per cent notes, the common was placed on a $6 a share annual dividend basis in January, compared with previous rate of $4 a share.

Kelly-Springfield Tire Co. has not shown an increase in earnings in the same proportion as the others, for the reason that its manufacturing capacity has not been expanded. It has under construction a new plant at Cumberland, Maryland, which will have a capacity greater than all its existing plants. The new factory will not be completed before end of this year, but Kelly-Springfield should show results of this development in 1921.

NEW INCORPORATIONS.

Aetna Tire & Rubber Co., June 30 (New York), $300,000. O. C. Meyer; E. W. Hallam; F. Trautwein, Jr.—all of 587 Manhattan avenue, New York City.

Ames Holden Rubber Boot Co., Ltd., May 5 (Canada). Preferred stock, $800,000. Common Stock $2,200,000. T. H. Rieder, president; directors—R. W. Ashcroft, D. L. McGibbon, H. Wellein, W. B. Wiegand. Principal office, Montreal, Quebec, Canada. Factory, Kitchener, Ontario, Canada. To manufacture and deal in rubber boots and shoes and all other things of which rubber forms a part.

Anderson Tire & Rubber Co., July 12 (Delaware), $7,000,000. L. Horty, M. C. Kelly, S. T. Mackey—all of Wilmington, Delaware.

Argonaut Tire & Rubber Co., February 5 (California), $3,500,000. R. Whitson; H. G. W. Dinkelspiel—both of Chronicle Building, San Francisco, California. Principal office, Oakland, California. To deal in auto tires and rubber goods for automobiles.

Cowart Non-Blow Out Tube Co., January 2 (Texas), $150,000. M. A. Dees, president; S. A. Cowart, vice-president; J. T. Simmons, secretary. Principal office, Midlothian, Texas. To manufacture tube that does away with all pinches, punctures and will not blow out if protected from the ground with small boots, no matter how old the casing.

Eastern Rubber Reclaiming Co., July 1 (Massachusetts), $30,000. H. E. Rooney, 24 Everett avenue; F. V. O'Neill, 196 Hamilton street; J. E. Marden, 42 Harvard street—all in Dorchester, Massachusetts. Principal office, Boston, Massachusetts. To conduct general rubber reclaiming and manufacturing business.

Eclipse Cord Tire Corp., June 16 (Delaware), $1,000,000. L. E. T. Connett, White Plains; W. J. Cullen, New York City; C. M. McKeever, Brooklyn—all in New York. To manufacture tires.

Erie Cord Tire Co., Inc., The, July 22 (New York), $50,000. F. X. McFarland; J. J. Cosgrove, both of 72 West 93rd street; T. Lyons, 122 West 102nd street—both in New York City. To deal in tires and automobile accessories.

Gillette Tire Company of New Jersey, Inc., May 25 (New Jersey), $25,000. F. F. Mitchell, 176 Peshine avenue; J. J. Keller, 46 North 17th street; U. G. Taylor, Jr., 163 Elizabeth avenue—all in Newark, New Jersey. Principal office, 164 Market street, Newark, New Jersey. Agent in charge, T. Furst. To deal in tires

Goody Rubber Co., Inc., June 28 (New York), $50,000. H. F. Vortkamp, 240 Broadway; R. M. Williams, 286 West 127th street, both in New York City; I. B. Joselow, 4922 New Utrecht avenue, Brooklyn—both in New York. To manufacture rubber and gutta percha.

Hartigan, Inc., John D., July 22 (New York), $5,000. J. D. Hartigan; E. J. Barnett; J. M. Kennedy—all of Lockport, New York Principal office, Lockport, New York. To deal in tires and automobile accessories.

Hydro-Speedway Tire Corp., July 9 (New York), $25,000. W. Stahlka, president and treasurer; A. A. Burkard, vice-president; H. Seitz, secretary. Principal office, 146 East Genesee street, Buffalo, New York. To deal in automobile tires.

Lion Tire & Rubber Co., Ltd., The, February 17 (Canada), $2,500,000. J. H. Greenberg, president; A. Tipling, vice-president; J. A. Campbell, secretary and treasurer. Principal office, 502 Kent Building, Toronto, Canada. To manufacture automobile tires, tubes and any other line of goods of which rubber forms a part.

Mason Rubber Plantations Co., The, April 5 (Ohio), $6,500,000. O. M. Mason, president; J. H. Diehl, vice-president; R. W. MacKinnon, vice-president; D. M. Mason, treasurer; W. A. Cluff, secretary. Principal office, Kent, Ohio. To own rubber plantations; to buy and sell crude rubber.

Mead Rubber Co., Inc., July 6 (New York), $100,000. J. F. Mead, 244 Jefferson avenue; J. L. Hagan, 1208 Dean street; A. P. Hagan, 114 Prospect place—all of Brooklyn, New York. Principal office, Brooklyn, New York. To manufacture tires.

Mechanical Rubber Manufacturing Co., May 19 (Massachusetts), $200,000. F. H. Nesmith, 6 Riedesel avenue, Cambridge; M. A. Tobin, 43 Fenwood Road, Boston; J. S. Stone, Wayland—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture, buy, sell, and deal in rubber articles.

Model Glue Mfg. Co., Inc., July 6 (New York), $10,000. F. Auerhahn, 470 55th street; M. Spivack, 1213 41st street, both of Brooklyn; H. Sherman, 541 West 144th street, New York City—both in New York. To manufacture glue, rubber cement, etc.

No-Air Auto Tire Co., Inc., July 8 (New York), $100,000. I. Trautman, 1909 52nd street; G. A. Carlucci, 188 President street, C. P. Carlucci, 239 Union street—all of Brooklyn, New York. Principal office, Brooklyn, New York. To manufacture tires.

Nojar Rubber Co., June 15 (Massachusetts), $100,000. T. Lithgow, 15 Gray street, Boston; A. E. Whittemore, 32 Winthrop Hall, Cambridge; V. G. Hopkins, 24 Hall avenue, Watertown—all in Massachusetts. Principal office, Boston, Massachusetts. To buy, sell and deal in any and all products made in whole or any part of rubber.

Poughkeepsie Tire Sales Co., July 16 (New York). $20,000. Raymond O. and Signor J. Seevers, 29 Market street, Poughkeepsie; J. F. Snyder, 245 West 55th street, New York City—both in New York. Principal office, Poughkeepsie, New York.

Prize Tire & Rubber Co., June 10 (New York), $7,500. H. Zaum, M. M. and R. Forma—all of 145 West 117th street, New York City. To make automobile tires.

Regent Tire & Rubber Co., Inc., June 28 (New York), $20,000. H. O. Kahan, president and treasurer; J. M. Saunders, secretary; I. L. Jacobson, vice-president. Principal office, 8 Stuyvesant street, New York City. To buy, sell, import, export and generally deal in tires and tubes.

Reliable Tire Service, Inc., June 24 (New York), $10,000. G. L. Jones, 489 Washington avenue; V. L. Belding, 25 Ten Eyck avenue; E. A. Piersen, 618 Myrtle avenue—all of Albany, New York. Principal office, Albany, New York.

Sanitary Rubber Products Co., June 10 (Delaware), $275,000. F. R. Hansel; J. V. Pimm; E. M. MacFarland—all of Philadelphia, Pennsylvania.

Service Rubber Co., The, March 5 (Ohio), $25,000. V. W. Rothe, T. E. Wilson, R. C. Goode, H. O. Hoffman, F. B. Wilson. Principal office, 381 Windsor street, Akron, Ohio. To manufacture dipped rubber goods, specializing in toy balloons.

Smith Tire Corp., Ray, June 21 (New York), $500. R. L. Smith, Hollis, Long Island; E. A. London, 792 Sutter avenue, Brooklyn; D. Fried, 317 Stanton street, New York City—all in New York. To conduct tire business.

Standard Rubber Co., June 23 (Delaware), $5,000,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To manufacture rubber articles.

Standard Rubbers Finance Co., June 23 (Delaware), $250,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To deal in rubber securities.

Tire Service Corp., June 16 (Delaware), $100,000. C. T. Cohee; G. G. Steigler; E. E. Aberlee—all of Wilmington, Delaware. To do a wholesale and retail tire and automobile accessory business.

Valentine-Fitch Rubber Co., May 28 (California), $100,000. W. D. Valentine, 229 Western Mutual Life Building, Los Angeles, California. Principal office, Los Angeles, California. To deal in all kinds of rubber goods.

Zaun Tire & Rubber Co., Inc., H. C., July 6 (New York), $100,000. R. Forma, 145 West 117th street; F. Fischer, 309 Broadway, both of New York City; H. C. Zaun, 107 Beebe avenue, Queens, both in New York. To manufacture tires.

SIXTH NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES.

Returning to New York City, the Sixth National Exposition of Chemical Industries will open in Grand Central Palace, September 20 and continue until September 25, inclusive. The expansion in the chemical industry, as shown by the increased number of exhibitors, necessitates the use of four floors in the Palace, and applications for space are still being received almost daily, so great is the interest in the exposition. Total applications for space up to June 30, were 358, which is a new record. The exposition this year will be more pretentious than ever; in fact, it will be the largest distinctly industrial exposition ever held, and will surpass its own predecessors by one-third.

Two new sections will feature the exposition this year. These are the Fuel Section and the Materials Handling Section. Both are considered very important. The business side of the exposition will have many interesting features. These include sessions on subjects which will be developed in the two new sections of the exposition, and sessions on chemical engineering for which elaborate programs have been planned. Motion pictures which will have keen interest for technical men, will be part of the program and there will also be addresses for the education of the public.

A WIDELY KNOWN FACTORY MANAGER.

JOHN KEARNS, manager of the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, was born in Boston, Massachusetts, in 1860, and was educated in the public schools of that city, graduating later from Comer's Commercial College. His first employment was with the Boston Car Spring Co. in 1879. In 1891 he joined the Overman Wheel Co., where he had charge of the rubber departments until 1898, when he went to the India Rubber Co., of Akron, Ohio.

JOHN KEARNS.

Three years later he went to Melbourne, Australia, to join the Dunlop Rubber Co. forces, where he remained until 1913, when he became associated with the Fisk Rubber Co., Chicopee Falls, Massachusetts. In 1916 he went to the Lee Tire & Rubber Co. and is at present its manager.

Mr. Kearns has had an exceptionally varied experience in the rubber business. He is almost as well known in England and the British Colonies as in America. In Ceylon he is interested in a rubber plantation and has many acquaintances throughout the Far East. He is a member of several fraternal orders and president of the Tuberculosis Relief Association of Springfield.

PERSONAL MENTION.

A post card from Raymond B. Price, one of the directors of the United States Rubber Company, dated Singapore, Straits Settlements, May 25, reports him visiting the Sumatra plantations of the company on the way to Japan.

Bushnell Bigelow, who for some time has been manager of eastern sales for The New Jersey Zinc Co., Inc., 116 Front street, New York City, now is assistant general sales manager for the company. Walter L. Hess takes Mr. Bigelow's place as manager of eastern sales.

Murray S. Bierer has entered the rubber brokerage business, with offices at 299 Broadway, New York City.

A. L. Viles, of The Rubber Association of America, has been honored by appointment upon the recently created New York Terminal Committee, to represent the shippers' interests. The other members are A. J. Miller, of the Delaware, Lackawanna & Western Railroad Co., representing the carriers; James Maybury, Jr., of the Public Utilities Commission of New Jersey, and Alfred M. Barrett, of the Public Service Commission, First District, New York.

The duties of the committee are somewhat similar to those of the terminal committees which served while the Government was operating the railroads. Their primary object is to bring about the greatest measure of cooperation among all the elements connected with the transportation situation.

Charles Mulier, general manager of the Standard Emarex Co., Chicago, Illinois, has severed his connection with the company and will engage in the mineral rubber business for himself. He has been identified with the company since its inception and is largely responsible for its success. During an experience of fourteen years he has studied the requirements of rubber manufacturers and has made many friends in the trade.

Edward J. Brown, formerly a salesman in the employ of the Acme Rubber Manufacturing Company, Trenton, New Jersey, and now connected with the Hood Tire & Rubber Company, of Pittsburgh, Pennsylvania, was recently married to Miss Mae St. Clergy, of Rockford, Illinois. The wedding took place at Erie, Pennsylvania.

Henry C. Pearson, Editor of THE INDIA RUBBER WORLD, New York City, has accepted an invitation to join the Honorary Advisory Council of the Fifth International Exhibition of Rubber, Other Tropical Products and Allied Industries and of the International Conference to be held in connection therewith in London in June, 1921, under the chairmanship of Dr. Joseph Torrey, A.M., Ph.D.

FACTORY MANAGER, SYRACUSE RUBBER CO.

WILLIAM E. GREER, factory manager and third vice-president of the Syracuse Rubber Co., Inc., Syracuse, New York, is a native of Akron, Ohio, where he was born April 24, 1884. He attended the grammar and high schools in that city and in 1898 entered the employ of The B. F. Goodrich Co., with which firm he remained until 1906, the first four years in the druggists' sundries department and the last four in the automobile tire department.

WILLIAM E. GREER.

Going to the Firestone Tire & Rubber Co. for a year as inspector of automobile tire casings, he then took a position with The Miller Rubber Co., starting its automobile casing and inner tube departments and remaining in charge for ten years. In 1917 he went to the Mid-Continent Tire Manufacturing Co., Wichita, Kansas, as factory superintendent, and on June 1, 1919, became factory manager and third vice-president of the Syracuse Rubber Co., Inc.

Mr. Greer's wide experience in some of the leading tire factories of the country and his specialized knowledge of cord tire construction well fits him for the task before him with this flourishing young company.

Mr. Greer is a Royal Arch Mason and a member of the Elks and Rotarians.

THE RUBBER TRADE IN THE EAST AND SOUTH.

By Our Regular Correspondent.

NEW YORK NOTES.

THE Electric Storage Battery Co. has removed its New York office from 100 Broadway, where it had been for the last twenty-two years, to the National Association building, 23-31 West Forty-third street.

The Hohmann, Nelson Co., Eau Claire, Wisconsin, manufacturer of a complete line of temperature, time and condensate controllers, recording and indicating thermometers, steam pressure regulators, etc., has opened an eastern sales office and sample room at 1599 Nostrand avenue, Brooklyn, New York, in charge of B. O. Pallin.

Mecke & Co., New York City, importers of crude rubber, etc., have admitted Nicholas Bruning, Orange, New Jersey, to the partnership whose other members are Hugo Volkening and Henry A. Ahrens.

The Hodgman Rubber Co., Tuckahoe, New York, is adding four additional stories to a one-story, reinforced concrete building already constructed, for the purpose of consolidating certain manufacturing operations.

The newly elected officers and directors of The Polack Tyre & Rubber Co., Broadway and 62d street, New York City, are as follows: Samuel Mundheim, chairman; Hugo Hoffstaedter, president; Reuben Mundheim, treasurer; Milton Dammann, secretary, and John F. Crowley, auditor.

The Powertown Tire Corporation, Rochester, New York, which was formerly The Rochester Tire & Rubber Co., has announced the following officers: Thomas J. Costello, president and general manager; Henry J. Crowder, vice-president; Dr. Ernest W. Ewell, treasurer; Arthur M. Johnson, secretary, and E. O. Benning, director.

The Niagara Rubber Manufacturing Co., 246 Herman street, Buffalo, New York, is a partnership of brothers organized for the pulling or reclaiming of fabric for manufacturers and to make blow-out patches, reliners, and skived patches. H. Heimerl is manager.

The Ajax Rubber Co., Inc., has found it necessary to move its Philadelphia branch office to larger premises, at 846 North Broad street.

CONNECTICUT NOTES.

The Kelley Tire & Rubber Co., Inc., New Haven, Connecticut, has increased its capital stock from one million to five million dollars. The company moved from its temporary headquarters into its new office building on July 14. The foundation and part of the first story of the main factory are well under way, indicating that the plant will be in operation late this fall, and making 500 cord tires and 2,500 inner tubes daily.

The New Haven Sherardizing Co. announces the removal of its main office from New Haven, Connecticut, to 868 Windsor street, Hartford, Connecticut. The factory was removed some time ago, as previously stated in our news columns.

SOUTHERN NOTES.

The Hopewell Insulation & Manufacturing Co., Inc., Hopewell, Virginia, which was incorporated in March, 1920, has installed extensive equipment for the manufacture of insulating compositions, insulators, and parts for electrical transmission, as well as for use with wireless apparatus. It expects to begin production at an early date and be able to build dies in addition to making molded insulation parts for electrical use. S. S. Sonneborn is president and general manager.

The Dixie Rubber Co., 768 Randolph building, Memphis, Tennessee, has practically completed the sale of its stock and authorized placing of contracts for its new factory, which it expects to have completed and in operation by January of next year. The factory equipment will cost approximately $220,000 and the powerhouse equipment over $100,000. The total cost of the plant and equipment is estimated at $434,600. William J. Greene is factory manager.

The Cord Tire Corporation, Chester, West Virginia, maker of "Superior" cord tires, has raised its capitalization from $500,000 to $1,000,000, in order to take care of increased business. The officers are: J. D. Comstock, president; H. B. Woodbury, vice-president, and H. J. Powers, secretary-treasurer.

E. T. Dempsey has been appointed manager of the Baltimore branch of the Mason Tire & Rubber Co., Kent, Ohio.

"TRUCKPORTATION" IS PROPOSED AS A TERM TO REPLACE THE words "truck transportation," in the interests of ease in use, descriptive value, and headline adaptability.

THE RUBBER TRADE IN NEW JERSEY.

By Our Regular Correspondent.

TRENTON NOTES.

THE LUZERNE RUBBER COMPANY, Trenton, has purchased a large tract of land along Brunswick avenue, fronting on the East Trenton Railroad. Since it was bought for investment purposes the consideration was not given. The property has a frontage of 60 feet and a depth of 900 feet and contains about five acres of land. It is an excellent one for manufacturing purposes, with good railroad facilities.

The K. B. Rubber & Tire Co., 117 East Hanover street, Trenton, New Jersey, has been made the New Jersey distributer for Bergougnan tires and tubes.

Charles H. Semple, president of the Semple Rubber Co., Trenton, has been made a director of the Carteret Club, which organization will shortly erect a new club house at a cost of $200,000.

Thomas Hydes, a crude rubber broker, has purchased a three-story factory building at 109 Chancery street, Trenton. Mr. Hydes has had his headquarters on East Hanover street for the past twenty years and will now have considerably more room in his new location.

Three of the Trenton rubber manufacturing companies have taken out permits for the erection of additions. The Woven Steel Hose & Rubber Co. has let a contract to John Carrigan for a one-story boiler house on Prospect street to cost $2,000. The United & Globe Rubber Co. will erect a one-story cement block addition to cost $1,500. The Home Rubber Co. will build a one-story frame building on Woolverton avenue to cost $1,500.

The Thermoid Rubber Co. has awarded a contract to the American Metallurgical Corporation, Philadelphia, for the installation of electric oven equipment to take care of the production of a special processed product to be placed on the market by the Trenton concern. The installation involves a number of new principles, especially pertaining to solvent recovery and automatic control of heat temperatures. The ovens will be placed in the new addition now being erected.

John E. Thropp's Sons Co., Trenton, New Jersey, has a new foundry under construction, which will cost about $80,000. The building will be 75 by 250 feet, and all necessary equipment has been purchased and is ready for installation.

MISCELLANEOUS NEW JERSEY NOTES.

The Duratex Co., Newark, New Jersey, expects to occupy the new addition to its plant by September 1. Ground for the new buildings was broken in December, 1919.

Announcement is made of the removal of the Bayonne, New Jersey, store of The Hudson Packing Co. to 67 East 21st street, Bayonne.

The Braender Rubber & Tire Co., Rutherford, New Jersey, has practically completed a one-story power house addition, which is expected to be in operation by the first of the year. The new building is 73 by 75 feet.

The Ford Tire Co., Erie, Pennsylvania, contemplates establishing a tire manufacturing plant at Burlington, New Jersey William James Whittom and Harry Raflovich, of the Ford company, called upon the city officials of Burlington and said they wanted to erect a plant for the manufacture of reconstructed tires and new tires. They announced that about $250,000 would be raised to start the factory and that the concern would eventually be capitalized at $2,000,000.

The factory will be two stories high and will employ about 300 men. Messrs. Whittom and Raflavich are said to have purchased a tire factory at Erie and the machinery is now being made at Trenton. The company claims to have a new mold which cuts

down the time of making a tire. The Burlington officials agreed to donate a parcel of land to the new tire company.

The Manhattan Rubber Manufacturing Co., Passaic, New Jersey, has let to the Stone & Webster Company, Broadway, New York, the contract for the erection of its reinforced concrete brick and steel plant. The estimated cost is $1,000,000.

The Eastern Tire & Equipment Co., with principal offices at 22-26 Union avenue, Rutherford, New Jersey, has filed a certificate of dissolution in the office of Secretary of State Martin at Trenton.

The Dural Rubber Corporation, Flemington, New Jersey, by arrangement with the Automatic Safety Tire Valve Corporation, 1765 Broadway, New York City, will include the "Whistler" tire valve as part of the regular equipment of all Dural tubes, adding only 35 cents to the cost of each tire. This tire valve was described on page 366 of THE INDIA RUBBER WORLD, March 1, 1920.

The Whitall Tatum Co., 46-48 Barclay street, New York, will soon have increased facilities at its druggists' sundries plant at Keyport, New Jersey. Ground for a three-story steel and concrete addition has already been broken, and the company hopes to occupy it by October first. The addition and equipment will cost about $200,000. The steady increase in the sale of "dependable goods" has made the extension necessary, though in the face of almost prohibitive building conditions.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent

THE FEATURE of the business situation among the Rhode Island manufacturing rubber industries and their auxiliary and coordinate branches, during the past month, has been the vacation period, practically all the plants in the State having been closed one or two weeks. Advantage has been taken of this opportunity for an overhauling of power and machinery, renovations, alterations and improvements.

In accordance with a plan announced this spring, the Alice Mill of the Woonsocket Rubber Co., at Woonsocket, closed down for one week, beginning July 31 and opening August 9. This plan is not in accord with usual custom of one department shutting down after another, but all were shut down on the same day and all started up again on the same day.

The National India Rubber Co., at Bristol, shut down its entire plant on July 31, for a period of one week, to reopen August 9. This is to be a vacation with pay for all the employes of the factory who reported for work after the recent cessation without the necessity of recourse to the reemployment plan.

The following changes in the organization of the National India Rubber Co., Bristol, were recently announced, to become effective immediately: James W. Franklin, assistant to the vice-president; Edward I. Cooper, factory manager; Edward A. Currier, Jr., industrial relations manager; A. W. Anthony, manager of central stores. Mr. Franklin had been superintendent of the plant and Mr. Cooper, assistant superintendent. Mr. Currier had been an office executive and Mr. Anthony had been industrial relations manager.

A three-day conference of the truck tire experts of the United States Tire Co. was held July 12, 13 and 14. The conference opened with a session at the Hotel Astor, New York, July 12. A banquet in the evening was followed by a theatre party, after which the convention proceeded to Providence, where Harlow W. Waite, factory manager of the Revere Rubber Co.'s plant, Valley street, Providence, addressed the conference. He commented on the fact that the motor truck industry seemed to be on the verge of an expansion fully as great as that which came to the passenger car industry a decade ago, and that Providence, as the centre of the United States Tire Co.'s truck tire activities, was destined to have a large share of it.

The conference, which was attended by more than 100 truck tire experts in the employ of the United States Tire Co., representing every State in the country, assembled at the new truck tire manufacturing plant of the Revere Rubber Co., which has been named the Colt plant in honor of Colonel Samuel P. Colt. Tuesday and Wednesday were devoted to the conference on truck tire development, at the first session the subject being solid tires, with C. K. Whidden, of New York, manager of the solid tire department, presiding. On Wednesday, W. V. Logan, manager of the pneumatic truck tire department, was in charge of the discussion. An inspection of the new Colt plant, with its special equipment of the most modern solid-tire-making machinery, was a prominent feature of the conference programme.

One of the most interesting events of the convention was the presentation to George S. Shugart, vice-president and general sales manager, of a set of platinum and pearl studs and buttons.

The rubber bathing suits that are being made by the Revere Rubber Co. at its plant on Valley street, Providence, were given a picturesque introduction to the public the latter part of June when some half a hundred Providence children appeared in a pretty bathing beach scene at one of the theatres. While the particular costumes used in the scene were designed expressly for the act, they were manufactured in exactly the same manner as the regular goods. The costumes are cut from a roll of thin rubber sheet a yard wide and 50 yards in length. This is done on the upper floor of one of the several buildings which compose the plant. Here, more than 300 young women, working under ideal sanitary conditions, cut most of the patterns and trimmings. The machine assembling is done on this floor, but the finer work of assembling is done on a lower floor. The trimmings, such as birds, butterflies and other decorations, are cemented on the caps, and the goods are inspected for the second time before going to the vulcanizing room, after which they are inspected for the last time, and any defective ones thrown out. At the theatrical performance, where hundreds of persons learned for the first time of the existence of such garments, many expressed surprise at the bright coloring of the costumes.

On July 15 the figures of the State Board of Tax Commissioners of the State revenue from corporate excess, franchise, public service and bank share taxes were made public, together with a list of all individuals, firms and corporations having an excess of $100,000 or more. Included in this list are the following, with the amount of their excess: American Electrical Works, Phillipsdale, $2,652,932.44; American Multiple Fabric Co., $124,-296; American Wringer Co., New York, $1,034,252.95; Anchor Webbing Co., Pawtucket, $252,420.06; Arbeka Webbing Co., Pawtucket, $163,438.99; Atlantic Tubing Co., Cranston, $244,574.50; Bourn Rubber Co., $276,700.29; Collyer Insulated Wire Co., Pawtucket, $505,759.07; Davol Rubber Co., $384,364.66; Everlastik, Inc., Boston, $351,695.20; Federal Felting Co., Westerly, $126,-103.60; Glendale Elastic Fabric Co., Easthampton, Massachusetts, $327,520.53; Goodby-Rankin Co., $139,366.66; The B. F. Goodrich Rubber Co., Akron, Ohio, $279,073.26; The Goodyear Tire & Rubber Co., Akron, Ohio, $291,601.79; Hamilton Webbing Co., Hamilton, $259,347; Hill & Lacross Co., $257,534.65; Hope Webbing Co., Pawtucket, $1,855,467.54; International Braid Co., $1,-409,900.80; Jenckes Spinning Co., Pawtucket, $8,059,520; Mechanical Fabric Co., $577,446.97; Mount Hope Spinning Co., Warren, $465,791.81; National India Rubber Co., Bristol, $2,213,025.04; O'Bannon Corporation, Boston, $1,394,939.87; Phillips Wire Co., Pawtucket, $2,159,288.83; Revere Rubber Co., $524,114.01; Tamarack Co., Pawtucket, $529,541.80; Tubular Woven Fabric Co., Pawtucket, $243,921.90; United Lace & Braid Co., Auburn, $512,-951.51; United States Rubber Co., New York, $2,105,090.29; Washburn Wire Co., Phillipsdale, $1,375,956.45; Woonsocket Rubber Co., Woonsocket, $607,025.83. The enormous increase of $3,994,861.70 over the tax of 1919 is shown in the assessment of the Jenckes Spinning Co., which has a corporate excess of $8,959,920.

A contract has been awarded to the Flynt Building & Construction Co., of Palmer, Massachusetts, for the erection of a three-story addition, 95 by 42 feet, to the storage house of the American Wringer Co.'s plant in Woonsocket, and work thereon will be commenced shortly. One floor of the addition is to be used for the manufacture of boxes and crates, and machinery for this purpose will be installed. The remaining two floors of the new building are to be devoted to storage purposes.

Frederick E. Luth, for the past 15 years in the employ of the Glendale Elastic Fabric Co., Providence, during several years of which time he was foreman in one of the departments, died June 27 in his 47th year. He was born at Newport, Rhode Island, and is survived by his widow, four sons, a sister and two brothers.

Clyde O. Dudley, for the past four years traffic manager at the National India Rubber Co.'s plant, Bristol, has resigned to accept the position of traffic manager of the Woonsocket Chamber of Commerce and assumed his new duties July 12. He is succeeded by J. D Cruickshank of the purchasing department.

FIRST GOODRICH SALESMAN IN NEW ENGLAND.

ELLSWORTH E. LEACH, Boston manager of mechanical and sundry sales for The B. F. Goodrich Rubber Co., was born at North Easton, Massachusetts, in 1862. Upon completing his course in the Stoughton High School in 1878 he began his career in the rubber trade as errand boy for the American Rubber Co., Boston. During most of the twelve years he remained with this concern he was engaged in sales, first as a traveling salesmen of general rubber lines in New York State and Canada. In 1884 Robert D. Evans, president of the company, appointed him associate manager to open the first New York office of the company as assistant to Eben H. Paine, who was later sales manager of the United States Rubber Co., Mr. Evans being the second vice-president of the latter company following Joseph Banigan. Mr. Leach's sales work covered footwear and clothing from New York west to Chicago and south to the Ohio River, including Philadelphia, Baltimore and Washington.

ELLSWORTH E. LEACH.

In 1890 Mr. Leach opened in Boston the largest wholesale and retail rubber store in New England, known as the Metropolitan Rubber Co. From 1894 to 1899 he was engaged in the manufacture of rubber clothing and mackintoshes under the firm name of E. E. Leach & Co., Boston.

In the latter year Mr. Leach became the first traveling salesman for The B. F. Goodrich Co. in the New England territory. In 1902 the Goodrich company opened a small office carrying a small stock of specialty and mechanical goods in addition to tires, and Mr. Leach was made manager of both the mechanical and specialty departments. The company moved into a larger store on Columbus avenue in 1905, and five years later to the present six-story building on Boylston street. Mr. Leach did all of the traveling sales work from 1899 to 1910. Since then the New England traveling force has grown to seven men with Mr. Leach still on the job.

On May 1, 1920, Mr. Leach rounded out twenty years of loyal and faithful service and the sales force and department managers of the company remembered the anniversary by giving a dinner in his honor and presenting him with twenty $20-gold-pieces, one piece for each year of service. Mr. Leach has a very wide acquaintance and many friends in the rubber goods trade and he has played an important part in guiding the destinies of the Goodrich company in this part of the United States. He is a member of the Boston Athletic Association, Bay State Automobile Club, G. A. R. Associates and has been for many years a trustee of the Universalist church of Stoughton.

THE RUBBER TRADE IN MASSACHUSETTS.

By Our Regular Correspondent.

"TRUCKPORTATION"—new terminology for freight hauling by pneumatically equipped motor trucks—has been given tremendous impetus in Boston and adjacent territory by the establishment of fifteen motor truck routes by The Goodyear Tire & Rubber Co. to give speedy and regular deliveries to service stations in the vicinity of Boston.

More than 68 per cent of all distribution from the local branch is being made by motor trucks, approximately 400,000 pounds of rubber products being transported each month. It is planned to deliver eventually by truckportation 95 per cent of sales made by the Boston office. Over 350 service stations are served by the fifteen truck routes. The company plans similar lines for those of its 74 branches in the United States affected by railroad transportation tie-ups.

The longest route running from the Boston branch is a two-day "Cape Cod" trip of 250 miles from Boston to Orleans, made weekly with stops at Plymouth, Sagamore, Brewster, Chatham, Woods Hole, Buzzards Bay and Wareham. The trip serves 40 distributers. The shortest line is the 50-mile run to Brockton, requiring less than eight hours and serving 12 distributors.

The 110-mile trip to Worcester is made tri-weekly in less than a working day to serve 33 service stations. Other routes run to Lowell, Weirs, Portsmouth, New Hampshire; Marlboro, Fitchburg, Athol, Rutland, Millbury, Haverhill and Gloucester, with many intermediate stops. Keene, New Hampshire is the terminus of a 168-mile route that will be established shortly.

BOSTON NOTES.

The O'Bannon Corporation, 30 State street, Boston, has had the honor of being recently cited by the War Department for meritorious service in the War.

The Central Automobile Tire Co., 111 Staniford street, Boston, is now a direct factory distributer for the Sterling Tire Corporation, Rutherford, New Jersey.

Lehigh tires are now available to New England motorists, a branch of the parent firm known as the Lehigh New England Tire Co. having been opened at 559 Columbus avenue, Boston. Fred W. Dogherty is manager and will be assisted in developing business in this territory by Paul H. Bradley, eastern sales representative.

The Croker Pen Co., 36 Bromfield street, Boston, has awarded a contract for a one-story addition to its plant at Everett, Massachusetts, 60 by 120 feet, to cost $45,000 to $50,000.

L. J. Waldron, for the last five years assistant manager of the Boston branch of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, has been promoted to the position of manager of the New England territory of the same company, with headquarters at Boston.

H. H. Greenwood, a pioneer in the automotive industry, and for the past five years general sales manager for the Hood Tire Co., Boston, is New England distributor for Syra-Cord tires, with offices and salesrooms at 739 Boylston street, Boston. Mr. Greenwood's firm, the Syra-Cord Tire Sales Co., has established twenty agencies throughout New England.

MISCELLANEOUS MASSACHUSETTS NOTES.

The first of a series of Harvard University summer school visits to industrial plants in this vicinity was made July 13, when G. F. Miller conducted fifty students through the plant of the Hood Rubber Co. at Watertown.

One of the best features of the service work of the Hood Rubber Co., Watertown, is the nursing of employes who are ill. Rain or shine, a corps of efficient nurses makes a daily round visiting the homes of Hood operatives who are out because of sickness. Each nurse has her Ford coupé for better comfort and in order to make the most of her time. In working conditions, medical and dental attention, and care in sickness the company is doing everything possible to build up a body of stable working men and women.

The Tyrian Service Association of the Tyer Rubber Co., Andover, Massachusetts, has recently approved a set of badges which will be awarded to those completing one, ten,

HOOD NURSES STARTING THEIR DAILY ROUNDS.

fifteen, twenty, twenty-five and thirty-five years of service. Several employes, including the general manager, will receive the thirty-five year badge.

For the last few months, groceries have been supplied to the employes through a cooperative buying plan. The cost of goods has thus been reduced, and a supply of sugar for the canning season secured. An athletic committee has lately been appointed, and a baseball team organized.

The recreation department of The Fisk Rubber Co., Chicopee Falls, has long been a potent factor in building up a contented, efficient working force, and this season its activities take on new interest through the addition of new buildings and facilities at Fisk Park, including a new restaurant and handball court. The park night season of Friday evening entertainments was ushered in July 16, when the park was officially opened for the year. There were the usual Red Tops' baseball game, handball, tennis, quoits, trap shooting, special track events, motion pictures, fireworks and dancing with music by the Fisk jazz orchestra. The restaurant makes it possible for Fiskers to go direct to the park after working hours, get a good meal and make the most of the long summer evenings afforded by daylight saving.

Friday afternoons there are special festivities for the mothers and children of Fisker families, and this year the playground section of the park has more new equipment for the kiddies, such as swings and slides. Admission is by identification card obtainable free of the recreation department.

The Metropolitan Air Goods Co., Athol, Massachusetts, a subsidiary of the Athol Manufacturing Co. of the same place, is building a new two-story plant, 50 by 140 feet, to be equipped with modern machinery for the manufacture of hospital rubber goods. The original company was formed in Boston in 1891 and survived under difficulties until 1913, when it was taken over by R. A. Whall, now its manager and treasurer, and incorporated as one department of the Athol Manufacturing Co. Outdoor pneumatic rubber goods are its specialties, but it also makes mattresses and cushions for hospital and domestic use. L. S. Starret is president of the company.

THE RUBBER TRADE IN THE MID-WEST.

(By Our Regular Correspondent)

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION.

THE MONTHLY MEETING of the Mid-West Rubber Manufacturers' Association, held July 13, at the Chicago Athletic Club, was largely attended. Much interest was shown by the members present in the business of the Association that continues to expand as the membership increases. At this meeting the following new regular members were elected. The Automobile Owners Tire Corporation, St. Paul, Minnesota; The Giant Tire & Rubber Co., Findlay, Ohio; Rotary Tire & Rubber Co., Zanesville, Ohio; The Sponge Tire & Rubber Co., St. Paul, Minnesota. The associate members elected were The Utility Manufacturing Co., Cudahy, Wisconsin, and The Towar Textile Mills Corporation, Toledo, Ohio.

The first annual outing and summer meeting will be held at the Hotel Breakers, Cedar Point, near Sandusky, Ohio, on Monday and Tuesday, August 16 and 17, 1920. The price of tickets has been fixed at $10.

As this is the first general rubber trade outing ever held in the Middle West, where so large a number of the rubber manufacturing plants are located, it has been decided to make the invitation general to everyone in the trade whether members of this association or not.

Cedar Point is an ideal spot for a summer's outing. There are commodious modern hotels, shady groves, amusement parks, a fine bathing beach, and a trip to historic Put-in-Bay, the scene of Commodore Perry's victory, is an added attraction.

It is but a fifteen-minute boat trip from Sandusky to Cedar Point, and boats run on regular schedule from Cleveland and Toledo. The Cleveland boat leaves at 8:30 a. m., arrives at Cedar Point 11:45 a. m. The Toledo boat leaves at 8:15 a. m. and arrives at Cedar Point 1:15 p. m.

The outing committee is as follows:. H. S. Vorhis, chairman; E. T. Meyer, F. R. Henderson & Co., Chicago; Paul A. Bloom, Fred Stern & Co., Chicago; C. H. Taveniere, Charles E. Wood, Chicago; G. Matthias, Jr., Mineral Point Zinc Co., Chicago.

MISCELLANEOUS MID-WESTERN NOTES.

H. G. Olivier, formerly associated with the Goodrich and Diamond rubber companies at Pittsburgh, Pennsylvania, and well known in the automobile tire trade through his fifteen years of selling experience, has been appointed manager of the Indianapolis branch of the McGraw Tire & Rubber Co.

H. G. OLIVER.

The Altenburg Tire Equipment Co., Davenport, Iowa, has purchased six and one-half acres of ground at West Davenport, on the Rock Island railroad, and the new foundry and machine shops now being erected on that site will be ready for occupancy by September 1. The goods manufactured will include complete tire repair equipment and molds, cores and machinery used in the manufacture of new tires. The capital stock of the company has been increased from $125,000 to $150,000.

The Surety Tire & Rubber Co., St. Louis, Missouri, is one of the new companies that are prospering. Two small buildings

have just been completed, and a third one is being started. For over a year the company has been manufacturing inner tubes, and now has begun to make cord and fabric tires of high quality.

The Hannibal Rubber Co., Hannibal, Missouri, has completed its factory buildings at a cost of $150,000, and as soon as the equipment is installed it will start operations. Both cord and fabric tires will be manufactured under the name "Mark Twain;" the inner tube is to be called "Indian Joe," after a Mark Twain character who still lives in Hannibal at the age of 92. Hannibal, it will be recalled, was the early home of the author. The officers of the company are: William J. Richards, president; H. M. Still, vice president; A. E. Gibson, secretary, and S. O. Osterhout, treasurer. Mr. Gibson will also serve as general sales manager and advertising manager.

Mason Scudder, a son of the founder and principal stockholder of the Rawlings Manufacturing Co., St. Louis, Missouri, has been elected vice-president of the company. The company manufactures game-balls of various kinds, including the "Ruko" which was described in THE INDIA RUBBER WORLD April 1, 1919.

L. N. Burns, who recently became associated with the Racine Auto Tire Co., Racine, Wisconsin, has been made head of the Horse Shoe Rubber Co. of Missouri, the distributing organization for Horse Shoe tires in Kansas and Missouri. Mr. Burns, until January 15, was vice-president and general sales manager of the J. I. Case Plow Works Co., of Racine. The Horse Shoe Rubber Co. of Missouri succeeds the Lindman-Funk Co., distributors, who introduced the "Horse Shoe" tire line in the two states. Offices are already established in Kansas City and St. Louis. Mr. Burns will be directly in charge of all sales in the two states. W. E. McClurg will be vice-president of the new organization and will be in charge of the St. Louis office.

L. N. BURNS.

Jacob Warner Culver, who has been promoted to the position of central district manager of the Federal Rubber Co., at Chicago, Illinois, is a native of that State. Born in Galesburg and a graduate of the high school, business college and Knox College there, he first worked in the local postoffice for four years. In 1899 he went to Chicago as a stenographer for the Ayer & Lord Tire Co. For five years he was an accountant for railroad contractors, and for ten years he was a salesman and district manager for the Boston Woven Hose & Rubber Co. Prior to his promotion he had for some time been manager of the Federal company's mechanical rubber goods department.

Mr. Culver is a member of the South Shore Country Club and various tire and rubber trade associations.

A. Daigger & Co., Chicago, Illinois, dealers in rubber ingredients, have inaugurated a free rubber manufacturers' service as an adjunct to their laboratory research department. At its head is an expert chemist and rubber man who is prepared to take up without charge or obligation any problems and technical difficulties pertaining to chemicals, colors and oils submitted by the trade. A market letter including technical notes will be issued from time to time.

The Brunswick-Balke-Collender Co., 623-633 South Wabash avenue, Chicago, Illinois, is making extensive additions to its plant at Muskegon, Michigan. One new group includes four separate buildings in which the cord fabric is impregnated. These buildings have been completed and the machinery installed, at the cost of $1,000,000, so they will soon be ready for occupancy. The company has recently increased its capital stock from $12,000,000 to $56,000,000.

The Athol Manufacturing Co., Athol, Massachusetts, is erecting at Marysville, Michigan, a new plant consisting of main building, store house and churn room, giving about 34,250 square feet of floor space. The most modern ideas of factory building and machine layout are utilized. A hundred men are to be employed. By the middle of August it is hoped that the company will begin the production of a high-class rubber-coated fabric, for use in the manufacture of automobile tops.

The India Tire & Rubber Co., Akron, Ohio, has placed its southern Wisconsin territory under the supervision of Calvin F. Troupe, former branch manager for the Fisk Tire & Rubber Co., with headquarters in Milwaukee, where he will work in direct connection with The Ramler Rubber Co., India distributer in that city.

Work has been begun on the new factory of The Wilson Rubber Co., Des Moines, Iowa, and the accessory factory is already in operation, manufacturing the Wilson "SlaPatch." This company was incorporated December 16, 1918, capitalized at $2,000,000, but active organization work did not begin until the spring of 1919. The executive offices are at 402-403 Hubbell Building, Des Moines, and the plant on the outskirts of the city, at West 63d street, River to River Road, and the Chicago, Milwaukee & St. Paul Railway. The officers are: W. E. Wilson, president and general manager; S. S. Wilson, vice-president; W. G. Richardson, secretary and treasurer. R. A. Torrey is mechanical engineer, and H. E. BeSaw is superintendent.

Some of the leading commercial artists of the country have prepared for the Standard Four Tire Co., Keokuk, Iowa, a series of twenty-six paintings portraying Indian lore and legend, to be used in an advertising campaign. The Indian Chief, Keokuk, who is said never to have broken a promise, once lived in the same locality, and the company has chosen his spirit and character to typify its own policy and aims. Consequently, Indian subjects were chosen for these paintings and the company has been to considerable expense for research work preliminary to their production, in order that they should be accurate in detail as well as characteristic portrayals of Indian life. They are said to compare favorably with the famous Remington paintings of Indians.

The Essenkay Products Co., Chicago, Illinois, has acquired 14 acres of ground at 83d street and Wentworth avenue, on which it will build a plant for the manufacture of its tire filler and rubber substitute known as "Essenkay." The first building, to be of concrete and steel, will be erected at an estimated cost of $300,000. F. D. Mayer is president.

The Hoosier Rubber Co., Mishawaka, Indiana, which manufactures "Service" rubber heels, is a partnership consisting of Ted Nicar and N. V. Robertson. Mr. Nicar was formerly with the Firestone Tire & Rubber Co., Akron, Ohio.

The Synthetic Rubber Products Co., Fort Branch, Indiana, has been making plans for extracting rubber from cactus and expects to have the first plant in operation August first.

"FLEXYDE" FOR MEN'S BELTS.

A material adapted for use as a substitute for leather is called "Flexyde" and is made of rubberized fabric pebbled on one side to imitate the grain of seal leather. It comes in either black or cordovan, but any special grain, color, or thickness can be made on special order. The standard size is 1/32-inch in thickness, in sheets 36 by 36 inches. One of the recent adaptations of this material is for use in the manufacture of men's belts, which are, of course, washable and therefore eminently practical and entirely sanitary. (The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.)

THE RUBBER TRADE IN OHIO.

By Our Regular Correspondent.

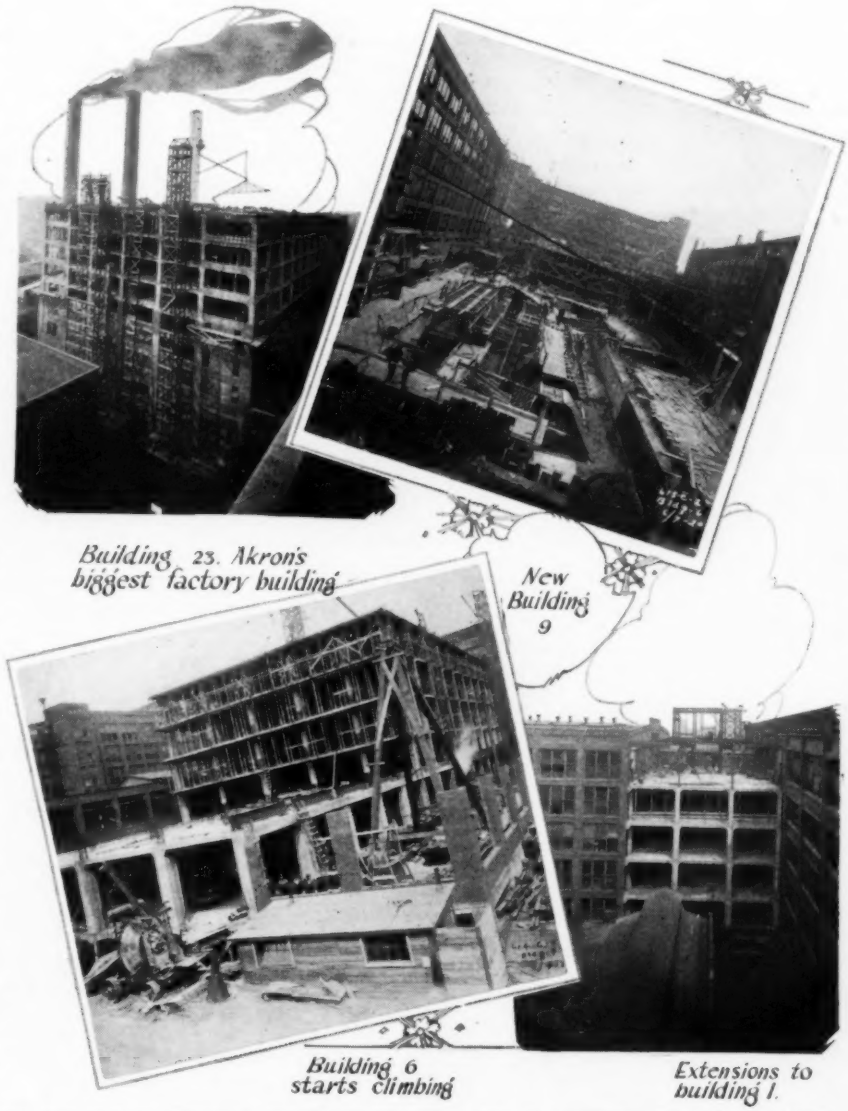
AKRON NOTES.

ONE OF THE LARGEST BUILDING expansions in the rubber industry at present is that of The B. F. Goodrich Rubber Co. at Akron. New construction is in progress which will increase the size of the plant twenty per cent and cost, with the new equipment and machinery, in excess of ten million dollars.

The new buildings will provide 779,000 square feet additional floor space, making a total of 4,554,304 square feet devoted to the manufacture of tires, hose, boots and shoes, and other rubber goods. Several thousand additional workers will be required next year to turn out the increased production planned.

The largest of the new buildings under construction is an eight-story warehouse for raw materials with 530,000 square feet of floor space. When completed it will be the largest factory building in the city. The second largest building will have nearly 200,000 square feet and will be used exclusively for tire building.

Other new buildings being erected include a giant water softening plant, an electric current transformer station, a large refrigeration building, and an extension to the boiler house of Mill 2. In spite of annoying delays in securing materials the work is going rapidly ahead, day and night, and it is expected that the program will be nearly completed before winter.



THIS NEW BUILDING EXPANSION PROVIDES 779,000 SQUARE FEET OF ADDITIONAL FLOOR SPACE, MAKING A TOTAL OF 4,554,304 SQUARE FEET DEVOTED TO THE MANUFACTURE OF GOODRICH PRODUCTS.

This new construction emphasizes the steady growth of the Goodrich company since it was organized fifty years ago, many years before any other rubber factory was opened in the "Rubber City." The original plant of the Goodrich company was a building 40 by 100 feet and only 35 employes were on the first pay-roll. To-day this original building could be tucked away and lost in any one of a dozen of the company's buildings. The force of 35 employes has grown to an army of 28,000 men and women.

An opportunity for employes of The B. F. Goodrich Rubber Co. to become holders of the company's common stock and to share in its profits is afforded by an employe's stock subscription plan recently approved by the company's executive committee.

The stock will be sold to the employes for $65 a share on weekly payments of 25 cents, each employe being allowed to buy one share for each $300 of his annual earnings. Stock will be sold in this way only to employes who have been with the company for three months or longer.

In the working out of the company's plan, stock purchased by the employe can be paid for at the end of three years and 24 weeks, even though the payments during this period will total only $44.98 per share. Accumulated stock dividends and service credits will make up the difference between this amount and the stock purchase price plus interest.

Every time the company pays a dividend on its common stock it will credit a like amount toward the payment of each share of stock on which employes are making payment. At the present dividend rate, such dividends will amount to $21 per share during the payment period.

The employe will receive through the service credit plan an additional credit of $6 on the payment of each share purchased. This service plan provides $1 credit on each share a year from date of first payment, $2 at the end of the second year, and $3 at the end of the third year. The service credits will be given even after the stock is paid for. At the end of the fourth year, $4 cash will be given on each share held and at the end of the fifth year, $5 cash. This will reduce the net amount cash paid for the stock of $35.98 per share.

The Akron Gear & Engineering Co., operating a machine shop at the corner of South and High streets, Akron, is contemplating building a large modern machine shop on its property con-

sisting of four and one-half acres of land on East Market street, with frontage near Martha avenue. The company manufactures all kinds of gears as well as rubber machinery, cores, and molds. Contracts for the new structure will be let at an early date. The officers of the company are: J. Asa Palmer, president; W. F. Warden, vice-president; W. J. Frank, secretary and assistant treasurer; Otis E. Prier, treasurer and assistant secretary; T. A. Seacrist, general manager; J. R. Triplett, sales manager; William A. Brubaker, superintendent and mechanical engineer. The above, in addition to N. C. Stone, president of the National City Bank, Akron, comprise the board of directors.

During the past month the men on the Akron city street-car lines struck for increased wages and the rubber companies, in order to bring their operatives to work, were compelled to organize one of the greatest truck transportation systems ever devised in the city. Sufficient warning of the coming of the strike was given and the whole emergency system of transportation was completed and officially announced in factory publications at least one week before the men actually went out.

Another opportunity was presented by the coming of the strike to show the importance the automobile and the truck holds in the business world of to-day. Reports from the various factories indicate production was affected little, if any.

Ralph Upson, C. R. Johnson and C. M. McCreery, all in the aeronautical department of The Goodyear Tire & Rubber Co., and their wives, set a new record when they took their Fourth of July picnic dinner in a free balloon several thousand feet in the air.

More than 600 factory foremen were guests of H. S. Firestone, president of the Firestone Tire & Rubber Co., at an outing given on Mr. Firestone's farm the latter part of June. It required a line of automobiles more than a mile and one-half long to transport the men to the farm. The day was spent in sports of various kinds, followed by a country dinner. The outing this year was the seventh given the foremen by Mr. Firestone.

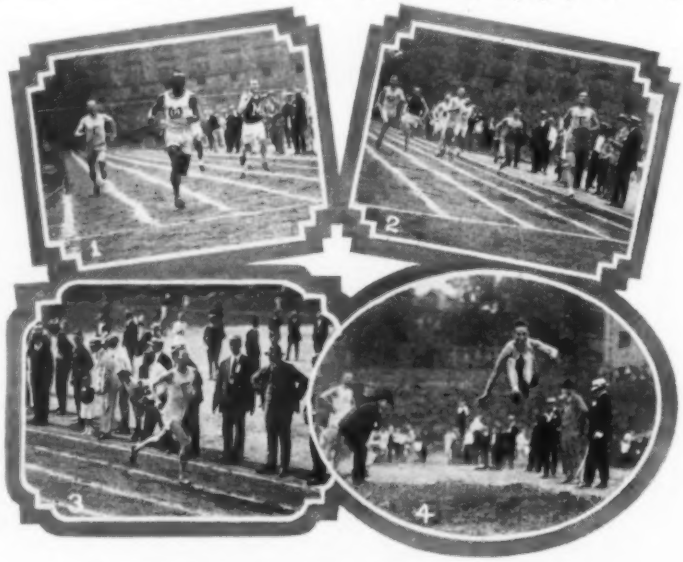
John Gammeter, of the experimental department of The B. F. Goodrich Co. has been named a member of the newly created State Aviation Commission.

F. W. Work, brother of B. G. Work, president of The B. F. Goodrich Co., was grand marshal of an Independence Day parade in Akron, Monday, July 5. Approximately 8,000 persons were in line.

Plans for an aviation exhibition to be given by the Akron Flying Club in the fall are being discussed. The plans provide for a more elaborate show than was held at Wright Field here recently.

H. C. Berry, of the Berry Airship Co., of California, has spent some time in Akron superintending the building of a dirigible by The Goodyear Tire & Rubber Co. for himself. The new machine will embody several features patented by Mr. Berry which will increase the speed of dirigibles.

Daily flights to Cleveland were made by airships from Akron during the aviation show held in that city July 2-7. The "pony" blimp, the only one-man dirigible on the market, was among the ships which made the flight.



Firestone Wins Industrial Track Championship at Pittsburgh, Pennsylvania.

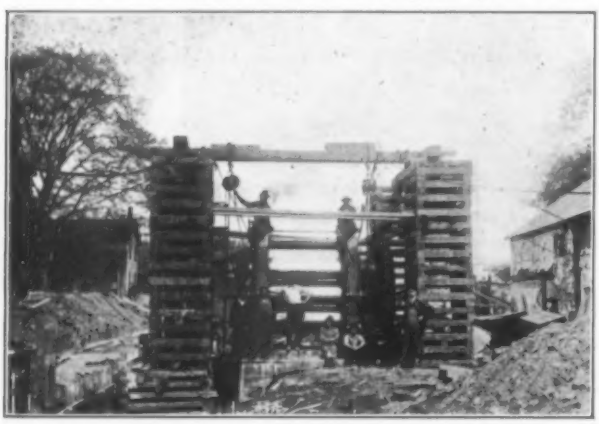
1. The Finish of the 100-Yard Dash, Matt Brown on the Left. 2 John Miller Taking Second in the 440-Yard Dash. 3. Peterson Bringing Firestone's Colors Home First in the Mile Relay, the Issue which Practically Decided the Outcome of the Meet. 4. The Running Broad Jump, in which Pittenger Took First and Miller Third.

A total of 4,200 men and women enrolled in the Americanization classes conducted this year in Akron under the auspices of the Board of Education. E. C. Vermillion, formerly in charge of the Firestone Americanization work, is director. A total of 136 classes was served by 105 teachers. Classes were held in basements of churches, homes, factories and in rooming houses. The outlook for next year is still brighter.

The Industrial Salvage Co., organized by George W. Sherman, formerly in charge of the salvage department of The B. F. Goodrich Co., is upon a paying basis and will be able to declare a small dividend this year. The company has dealt largely with salvaged boilers and machinery during the past year. The war left a large amount of machinery in factories which is now useless in its present location and the company has been busy buying it up and shipping it to other locations where it is needed. The plan to make a house-to-house collection of salvage was postponed because of the amount of business coming to the company.

The Miller Rubber Co., Akron, increased its sales 63½ per cent during the six months ended July 1, 1920. From 1915 to 1919, the company's sales have increased 1,300 per cent. The business of the present year, it is estimated, will total $50,000,000.

The India Tire & Rubber Co., Akron, has made the following appointments: J. E. McGinnes, formerly branch manager for the Firestone Tire & Rubber Co. in Milwaukee and manager of



In Order to Save Time and to Commence Production at the Earliest Possible Date in His New Plant an Enterprising Rubber Manufacturer in the Akron District Installed the Calender Before the Building Was Erected.

tire sales for The General Tire & Rubber Co., Akron, has been placed in charge of sales promotion work and K. C. Burtscher, well known in railroad circles, has been appointed traffic manager. He was formerly connected with the Wheeling and Lake Erie railroad and with the traffic department of The Goodyear Tire & Rubber Co., Akron.

The Supreme Cord Tire & Rubber Co., Akron, Ohio, with an authorized capital of $2,000,000, is erecting a new plant on Home avenue. The main factory building is 60 by 300 feet, of brick and steel, and a power plant, 40 by 50 feet, is of the same construction. The officers and directors of the company are:

R. C. Witwer, president; A. G. Kaufmann, vice-president; Charles O. Patier, secretary-treasurer. The other members of the board of directors are: L. C. Koplin, William J. Kaufmann, Hon. Thomas H. Moore, S. W. Sweet, P. E. Welton, J. L. Swartz, B. L. Eaton, and W. B. Campbell.

MISCELLANEOUS OHIO NOTES.

Jay Chamberlin has been appointed manager of the Cleveland branch of the Pennsylvania Rubber Co., Jeannette, Pennsylvania. For the last two years he has represented the company in the Chicago territory.

The Pharis Tire & Rubber Co., Newark, Ohio, is erecting a 100 by 120-foot, three-story brick and steel addition and a new power house, and adding 100 per cent to the machinery equipment for the purpose of increasing production to 1,000 tires and 1,000 tubes daily. This company was one of the first to build 30 by 3½ clincher cord tires, and the growing business, principally with large jobbers, requires additional factory facilities. By November the company expects to be building all sizes of cord tires. The officers are: A. R. Lindorf, president; C. H. Otto Meyer, vice-president; Charles O. C. Lindrooth, secretary; R. S. Wyeth, treasurer; Carl Pharis, general manager.

The Hercules Rubber Corporation, with main offices at 908 Union Central Building, Cincinnati, Ohio, has purchased 35 acres of land on which it will erect a modern factory and power plant for the production of its special airless inner tube.

The Columbus Tire & Rubber Co., Columbus, Ohio, is installing machinery for the purpose of manufacturing fabric tires, in addition to its equipment for the manufacture of cord tires. It expects to produce fabric tires about August 1, 1920.

The Kee-Spears Rubber Co., Clinton, Ohio, which was incorporated November 3, 1919, to manufacture a general line of molded and mechanical rubber goods and hard rubber goods, including interior doors, door and window casings, room moldings, etc., has purchased a factory and is nearly ready to begin manufacturing. An additional building will be built at an early date, which will double the capacity of the plant. The officers of the company are: George A. Griffiths, president and general manager; W. W. Spears, vice-president; Culley B. Hall, secretary; A. J. Kee, treasurer; directors—Dempsey Lowe and Benjamin Blackmore.

Charles H. Wheeler has been elected a director of The McGraw Tire & Rubber Co., Cleveland and East Palestine, Ohio.

C. D. Rockwood, purchasing agent of the Mason Tire & Rubber Co., Kent, Ohio, has returned from the Far East, which he visited in the interest of the Mason Rubber Plantations Co. He found conditions there very promising. J. P. Matthews, former purchasing agent of the company, remains at Singapore as far eastern representative.

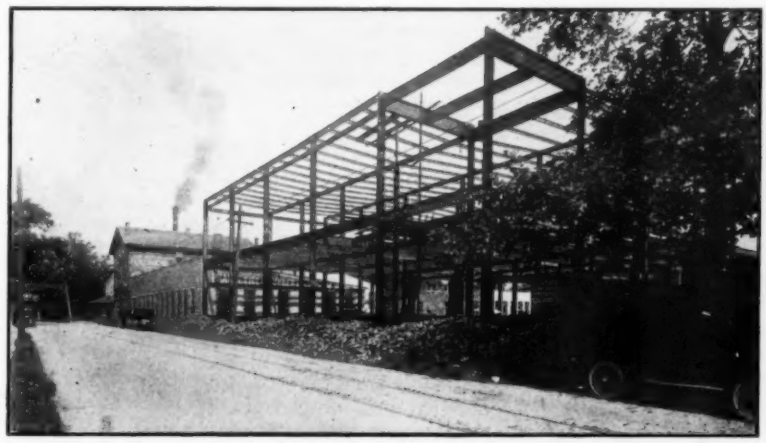
The Premier Rubber & Insulation Co., Dayton, Ohio, has increased its capitalization from $150,000 to $250,000, owing to the great increase in business. The plant is now running night and day, in order to meet the heavy demands for hard rubber and bakelite products. The newly-elected officers of the company are: William Grether, president and treasurer; William F. Grieser, vice-president; John H. Shively, secretary.

The above-named, with Joseph Westendorf and Harry H. Gerstnor, comprise the board of directors. Henry Spatz has been appointed factory manager.

The National Rubber & Specialties Co., Chickering avenue and C., H. & D. Railway, Cincinnati, Ohio, manufacture a line of cements for bicycle, motorcycle, and automobile tires, as well as braziers, vulcanizers, enameling ovens, etc., for tire repair work.

The population of Kent, the home of The Mason Tire & Rubber Co., has been announced by the census bureau as 7,070. In 1910 the village had a population of 4,488. The increase was 57.5.

Ohio C. Barber, match king, capitalist and agriculturist who died in January, left an estate of more than $5,000,000, it was shown, when his will was offered for probate recently. Some of the buildings on the Anna Dean farm, containing 1,000 acres, are being converted into dormitories and manufacturing buildings. The Babcox-Wilcox Co. of Barberton has leased one of the buildings for dormitories for additional men.



NEW BUILDING FOR THE PHARIS TIRE & RUBBER CO.

GENERAL HILLS, A NEW AKRON SUBURB.

An unusual scheme to beat the high cost of homes and at the same time solve the housing problem has been put in effect by the General Tire & Rubber Co., Akron, Ohio. The employes of the company, by adopting a plan of W. O'Neil, general manager, took over a 243-acre tract of land on the Massillon road about 1¼ miles from the General plant and formed a development syndicate with Mr. O'Neil as trustee. This is believed to be the first time that the employes themselves have got behind a home-building project and undertaken its financing and development.

One thousand homes will be constructed to cost $5,000 to $6,700 and compare identically with property which has been bringing $9,000 or more. Quite a sum of money is being saved by finding various men in the factory who have had experience in lumbering, road building and construction work, and these men were put in charge of the work with which they were familiar, thus eliminating contractors.

When completed the section will be known as General Hills.

It lies about 500 feet from Springfield lake, overlooking the lake and the valley. All conveniences, such as electricity, sewer, pavements and sidewalks, will be provided. Plans call for the formation of a community waterworks. A business center has been laid out and buses will operate from the community every 30 minutes.

In working out the General Hills plan, enabling the men to finance the enterprise, a double purpose has been accomplished, because while overcoming the financial handicap in home building, the men at the same time have been given something to take the place of unwise investments in the numerous wildcat stocks and other promotions which have been sweeping the country and which have contributed to the unrest of good workmen.

A DESIGNER OF RUBBER MACHINERY.

CURT KUENTZEL, experimental engineer with The B. F. Goodrich Co., Akron, Ohio, was born in Erfurt, Germany, in 1880. After studying at the Technical High School in Charlottenburg and the universities of Jena and Berlin, he graduated in 1903.

CURT KUENTZEL.

His first position was with Siemens & Halske Gummiwerke in Berlin, and he was later with the Gummiwerke Oberspree of the General Electric Co., in Berlin, Gummi & Kabelwerke, Dr. Cassirer & Co., in Charlottenburg, and Süddeutsche Gummiwerke, in Mannheim.

In 1909 he came to America as assistant superintendent in the insulated wire department of the Diamond Rubber Co., Akron, Ohio. His training and inclination tended toward development work rather than management, and since that time he has held the positions of experimental engineer with the Goodyear Tire & Rubber Co., Akron, Ohio, and the Republic Rubber Co., Youngstown, Ohio, and is at present engaged in that capacity with The B. F. Goodrich Co.

In 1917 he planned and installed the Neumaticos Nacional, a rubber factory in Barcelona, Spain, of which he is now temporary manager. After a stay of a few months this year he will return to The B. F. Goodrich Co.

The patent records furnish eloquent testimony to Mr. Kuentzel's initiative and activity. He is the inventor of numerous rubber manufacturing machines, devices and processes, especially in the tire building branch of the industry.

THE RUBBER TRADE ON THE PACIFIC COAST.

By Our Regular Correspondent.

LOS ANGELES NOTES.

THE SAMSON TIRE & RUBBER CO., 333 Pico street, Los Angeles, has just shipped a cargo of tires and tubes to San Salvador, Peru, and New Zealand, and is planning a considerable extension of its export trade.

The Pacific Rubber Co., coast distributer of Horseshoe tires, has moved into its new general offices at 415 East 8th street, Los Angeles, a commodious, two-story, up-to-date building. According to Roy R. Meads, president and general manager of the company, the San Francisco branch has within a few months increased its sales several hundred per cent.

The "Wingfoot Clan" is the title of a bright, new weekly shop paper which made its début at the Los Angeles Goodyear plant in July. It is in charge of F. H. Fuller, manager of the personnel department of the Los Angeles factory.

The Keaton Tire & Rubber Co., maker of the Keaton non-skid tire, has established a branch salesoffice in a new two-story building of its own at 1337-1339 South Flower street, Los Angeles. Alan T. Tarbell is in charge.

The first tires or tubes to be shipped east from Los Angeles have been sent out by the George W. Eno Rubber Co., of 1026 South Los Angeles street, Los Angeles, which recently forwarded 3,600 inner tires, as the endless liners made by the company are called, to Milwaukee. The same concern is preparing to ship a carload of the liners to New York at an early date, and will begin the manufacture of tubes in August.

M. C. Hale, president of the United States Compression Inner Tube Co., Tulsa, Oklahoma, announced on July 9 that his company had finally decided to establish its West Coast factory in Burbank, a suburb of Los Angeles, California, and had bought a site of 12½ acres there. Work on the factory will be started at an early date. A pneumatic tube, said to be practically punctureless, is the company's chief product. At the company's main plant in Oklahoma 2,000 tubes and 200 tires are turned out daily. C. R. Privett has charge of sales. The company's Los Angeles office is at 411 Citizens' Bank Building, and it also maintains a sales branch in Pittsburgh, Pennsylvania.

R. M. Merriman will be technical superintendent of the new factory of the Fabri-Cord Tire Co. about to be erected at San Pedro. Mr. Merriman held a similar position with The B. F. Goodrich Co. for twelve years. At present he is in Akron, Ohio., buying machinery, etc., for the new plant. He holds many valuable patent rights on tires, tubes, and machinery.

Of much interest to local rubber manufacturers who are anxious to get materials cheaply and quickly from the East, was the recent arrival at Los Angeles of the *Artigas*, the first vessel to be sent here from Philadelphia, via the Panama Canal, by the North Atlantic & Western Steamship Co.. The voyage was made in 18 days and 18 hours. Three other vessels will soon be placed in service.

JAMES H. CHRISTIAN.

James H. Christian, president of the Fabri-Cord Tire Co., the latest rubber manufacturing enterprise in Los Angeles, California, was the first president of the Perfection Tire & Rubber Co., of Fort Madison, Iowa; and patented the well-known asbestos breaker strip. Having disposed of his interests, he took up cotton growing in Arizona, later formed the San Gabriel Reservoir Co. in Southern California, and finally the Fabri-Cord Co. Mr. Christian was born in 1866 at Mt. Carroll, Illinois, and has been in the real estate and building business in Detroit and Chicago.

The Kelly-Springfield Tire Co., the Goodyear Tire & Rubber Co., the Firestone Tire & Rubber Co., The B. F. Goodrich Rubber Co., and the United States Rubber Co. helped to finance a

recent ship-by-track run of 636 miles between Los Angeles and Imperial Valley, in the demonstration of the value of motor freighting under adverse conditions.

A direct shipment of 600 tons of crude rubber valued at $750,000, from the Goodyear plantation in Sumatra, arrived in Los Angeles last month by the Los Angeles-Pacific Steamship Co.'s freighter, the *West Hika*, and is the first to come to the

PLANTATION RUBBER CARGO ARRIVES AT LOS ANGELES.

local Goodyear plant through the Los Angeles harbor. The illustration shows C. H. Kelly, W. J. Yarnell, Goodyear crude rubber department, C. W. Case, traffic manager, and the first sling of rubber to be unloaded. It is said that the Goodyear plant will use 18,000 tons of rubber annually when running to capacity.

It is stated at the Goodyear works that, while 2,000 are now employed, the company has applications from 7,000 for positions in the new plant. Eastern rubber workers are accordingly advised to hold their jobs and not to migrate to Southern California for a while at least.

J. O. Ward, manager of the Los Angeles branch of the Miller Rubber Co. of California, at 1233 S. Hope street, Los Angeles, is making a trip through the East and will spend some time at the Miller factory in Akron.

The California ad Arizona sales of Midco tires, manufactured by the Mid-Continent Tire Co., of Wichita, Kansas, will be handled by Bradford-Fuller, Inc., Figueroa and Eighth streets, Los Angeles.

SAN FRANCISCO NOTES.

B. M. Schreckengost, general factory representative of the Globe Rubber Co., of New York, who recently made an inspection tour on the Coast, reports that his business shows a healthy increase.

The Luthy Electric Storage Battery Co. has moved into its new building on Geary street, near Larkin, San Francisco. J. P. Schiller is in charge.

The Federal Rubber Co. of Illinois, Cudahy, Wisconsin, is erecting a new five-story warehouse and office building at Second South Park and Taber Place, San Francisco, according to E. L. Rettig, Pacific Coast manager for the Federal company. A large stock of tires will be kept here for Coast and export trade. The building, which will be completed this fall, will have approximately 70,000 square feet of floor space, and will cost about $125,000. One of its features will be a special track extending through the building which will greatly facilitate the handling of incoming freight.

Good headway with its new building plans is reported by the Coast Tire & Rubber Co., of Oakland. A building is being erected on East 12th street, between 48th and 50th avenues, and machinery and general equipment have just arrived from the East. The company has been having its cord and fabric tires made in Akron, but after September 1 it expects to do all its own manufacturing.

The exclusive agency for Owen cord, fabric, and solid tires for Northern California and Nevada has been acquired by the Owen Pacific Tire & Rubber Co., of 135 Hyde street, San Francisco, for which Harry A. Parker is sales manager.

George E. Machen and J. Dickson Smith have formed the Machen-Smith Tire Co., 1240 Van Ness avenue, San Francisco, specializing in half-sole tire work.

L. M. Simpson, for two years manager of the clothing and footwear department of the Los Angeles branch of the United States Rubber Co., has been transferred to Sacramento, where he will have entire charge of the U. S. R. Co.'s branch in that city. Mr. Simpson is a graduate of the University of Illinois, and very popular with his Los Angeles associates.

The Kelly Tire Service Co. has moved its headquarters from San Francisco to Stockton.

SOUTHWESTERN NOTES.

That success has followed the introduction of the bonus and premium plan of compensating workmen is the report of the Spreckels "Savage" Tire Corporation, San Diego. The system provides a premium for workmen making a required number of points contingent upon the work to be done, which must meet a certain standard. On the other hand, a penalty is imposed on workers for manifest carelessness. A decided improvement in the quality and quantity of the output and a better morale are said to be the outstanding results.

As many as 25,000 toy balloons are being made daily by the Pacific Balloon Co., of Riverside, a branch of the Howe-Bowman Balloon Co., Newark, New Jersey. Chain stores are among the largest buyers of the goods. Harold A. Dodge is the manager of the factory.

The entire town of Marinette, Arizona, fourteen miles northwest of Phoenix, and 7,800 acres of adjacent land have been bought by the Southwest Cotton Co., a subsidiary of the Goodyear Tire & Rubber Co. This territory now brings the total amount of land owned by the company and to be used for raising long staple cotton for tire fabrics up to 36,000 acres. This does not include 20,000 acres that have also been leased by the company for the same purpose, but which are held for future needs. The company is planning to erect dwellings on the newly-acquired land similar to those provided for the 2,000 employes who work on the company's plantations at Litchfield and Goodyear in the Salt River Valley.

Of the 30,000 acres planted to cotton in the San Joaquin Valley, California, most of it has been devoted this year to the raising of the Pima long-staple cotton needed for automobile tires. A government crop expert reports the cotton there as further advanced than in any other part of the Southwest. In experimental patches last year the Pima cotton in the valley averaged 520 pounds to the acre, but allowing 500 pounds to the acre for 1920 and with the cotton selling at $1.50 a pound, a return of $750 on each acre can be counted upon. The Mexican boll-weevil has done considerable damage to short-staple cotton in Texas and other Southern states, but so far the long-staple cotton crop in the Southwest has escaped injury.

NORTHWESTERN NOTES.

According to C. H. Boyer, western district manager for the General Tire & Rubber Co., of Akron, Spokane, Washington, is being considered as a probable site for a Pacific Coast branch factory.

R. S. De Orell, formerly with the Hartford, Knight, and Lee tire concerns, has been appointed superintendent of the Washington Tire & Rubber Co., which started in Spokane two years ago, and is now turning out 75 Western States tires a day.

The Western Rubber Co., Tacoma, Washington, has begun operations in its new plant. Tires are being manufactured in limited quantities only and chiefly for testing purposes, but the plant and equipment are equal to a capacity of 1,000 tires and 1,000 tubes a day.

The Tri-State Tire Co., distributer of Perfection tires, has leased a new building being erected at the corner of 10th and Stark streets, Portland, Oregon. A few stores in the building, which is 108 by 120 feet, will be subleased to accessory dealers, but the remainder will be occupied by the Tri-State Tire Co. A service station will be maintained, with a repair shop in the rear, reached by a driveway from the street.

Barry Wilson, formerly with the United States Rubber Co., and well known in the trade in San Joaquin and Sacramento Valleys, has taken charge of Firestone's Nevada tire business, with office at Reno, Nevada.

TIRE REPAIRING ON THE PACIFIC COAST.

Coincident with the rapid development of the automobile trade on the Pacific Coast, and influenced in no small degree by the rising cost of tires, has come about a notable growth in the tire-repairing industry. A year ago there were scarcely 400 vulcanizing shops on the Pacific coast, but to-day there are close to 600, over one-half the number being in California.

PIONEER PNEUMATIC-TIRED TRUCK.

A Packard truck equipped with Goodyear cord pneumatic tires has established the world's record for motor trucks in a coast to coast run from Los Angeles, California, to New York City. The total distance of 3,451 miles was covered in a total elapsed time of 13 days, 13 hours and 15 minutes. The actual running

Goodyear Transcontinental Truck and Men Who Drove It from New York to Los Angeles. Insert, Left to Right, Howard Scholder, Herbert Temple.

time was 8 days, 12 hours and 55 minutes, and the average speed was 15.8 miles. Not a single tire change was made on the trip, which demonstrates the practicability and advantages of pneumatic tires in truck transportation.

As direct evidence that pneumatic tires prolong the life of a truck, the history of this one is interesting. Built in 1918, it has been in continuous service a little more than two years and has traveled approximately 120,000 miles. It has a three-ton chassis with a five-ton motor and carries a big enclosed body in which is a sleeping bunk, as well as room for a consignment of freight.

Its initial service was on the Akron to Boston express route, carrying Goodyear products to eastern points and bringing back fabric from mills, round trip 1,500 miles, time 5½ days. In 1918 and 1919 it was part of the motorcade carrying boy scouts on long tours through the eastern states. In the autumn of 1918 it made the first transcontinental trip from Boston to San Francisco and return carrying a consignment of airplane tires, round trip, 7,763 miles. Its second transcontinental trip was made in July, 1919, with the army motor convoy to San Francisco over the Lincoln Highway and return, carrying the Goodyear band which furnished music for the soldiers in convoy.

CANADIAN NOTES.

The Premier Tire & Rubber Co., Limited, Hamilton, Ontario, has been incorporated, under the laws of Ontario, with letters patent granted January 10, 1920. A fectory building, one story in height, 50 by 150 feet, is going up rapidly at Beamsville, Ontario, probably to cost $27,000. The company hopes to be turning out tubes at the rate of 400 to 1,000 a day by January, 1921. The officers are: Heber Tremaine Pyke, president, and William S. Attwood, vice-president. Estelle Margaret Pyke is a director, in addition to the above-named, and Messrs. Barr & McBride have been appointed auditors.

F. M. Morgan has returned to the Ames-Holden-McCready System, Regina, Canada, as manager of the Saskatchewan division, with headquarters at Regina.

Following the return of J. Westren, general manager of the Dunlop Tire & Rubber Goods Co., Toronto, Ontario, Limited, from England and the Continent, W. B. Northam, general sales manager of the Dunlop company, has sailed for England to be gone two months.

The building operations and the installation of the machinery in the new cord tire plant of the Dunlop Tire & Rubber Goods Co., Limited, at Toronto, are nearly completed and manufacturing will probably begin early in August.

The Dunlop Tire & Rubber Goods Co., Limited, Toronto, Canada, has inaugurated an employes' insurance plan as an evidence of their interest in the welfare of their employes and their goodwill toward them. More than 2,000 people are insured for amounts ranging from $500 to $2,500 according to length of service. The policy increases as the term of service lengthens, and the premiums are paid by the company, the employe being under no obligation. However, in the event of an employe becoming totally and permanently disabled before the age of sixty he or she receives the proceeds of the policy.

In 1919, Canadian automobile factories manufactured 94,000 motor vehicles and sold more than $100,000,000 worth. There were 325,000 automobiles registered in the Dominion, compared with about 90,000 in 1915. The demand for motor trucks is increasing.

TARIFF NOTES.

Modifications of existing tariffs have been made in several European countries: Belgium, from June 21 on, adds to the tariff duties for rubber tires a "coefficient of increase of 2." Poland until further notice suspends the duties on rubber packing. Portugal imposes an export tax, from June 5 on, of 10 per cent ad valorem on wares of rubber, gutta percha, balata and similar products in any condition. A license to export is required.

The All America Cables Co. has opened a new cable service connecting Rio de Janeiro and Santos with the United States, and the rate from New York to Brazil has been reduced from 85 to 65 cents. The new cable system embraces over 22,500 miles of cables and land lines, and has recently entered Bolivia. Cables from Colon to points on the north coast of Colombia are now being laid, and soon a triplicate cable from Ecuador to Peru will be in operation.

S. Yamada, well known in the Japanese rubber trade and formerly director of the "Gomu-Sekai" (Rubber World), has been appointed editor-in-chief of the "Gomu Jiho" (Rubber Times), the monthly journal of the Tokio Rubber Association.

THE OBITUARY RECORD.

PRESIDENT OF THE PENNSYLVANIA RUBBER CO.

HARRY WILFRED DUPUY, president of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, died July 4 at the French Hospital, New York City, where he had been taken following a stroke of apoplexy eleven days previously while on a visit to New York. He was only thirty-nine years old. For the past year he had been in poor health and had planned to sail for a trip to Switzerland with his family on July tenth.

HARRY W. DUPUY.

Born at Pittsburgh in 1880, Mr. DuPuy was educated in the high school at Pottstown, Pennsylvania, and in 1903 was graduated from Yale University with the degree of B. A. The following year he started in business with the Pennsylvania Rubber Co., first in the testing department, then advancing to assistant treasurer, later treasurer, and finally to president and treasurer in 1912.

Before the United States entered the war, Mr. DuPuy trained at Plattsburg, New York, for his commission, and entered the service in 1917. The arduous nature of the training which he again underwent, both at Plattsburg and Fort Niagara, it is said, left its permanent imprint upon him, and was indirectly the cause of his illness. He was a member of The Rubber Association of America, Society of Automotive Engineers, Association of National Advertisers, Aero Club of America and Motor and Accessory Manufacturers.

Mr. DuPuy is survived by his father, Herbert DuPuy, chairman of the Pennsylvania company's board of directors, and by his widow and son, all of whom live in Pittsburgh, where the family is active both in a social and business way. His brother, Charles M. DuPuy, is vice-president of the Pennsylvania company.

A PROMINENT SHOE TRADE JOURNALIST.

Frederic Farley Cutler, who was prominent in shoe trade journalism, died July 16, 1920, at his home in Newton Centre, Massachusetts. Since last December illness had prevented his being active in business. He was in his fifty-fifth year.

Mr. Cutler was born in Boston in January, 1866, and graduated from the Boston Latin School in 1885, but, after taking the entrance examinations for Harvard University, decided to enter business and took a position with the leather firm of Proctor, Hunt & Haskell. Five years later he entered the field of trade journalism and became manager of the Shoe and Leather Reporter Company, and in 1901 became president and treasurer of this company, afterward becoming the owner. In 1898 he established "The Shoe Retailer," and was also owner of that publication.

Mr. Cutler held membership in The Country Club, the Bræ-Burn Country Club, Algonquin Club, Boston Athletic Association and in several other clubs in Newton, also in Hyannis, where he had a summer home, and at Pinehurst, North Carolina. He was also a member of the Masonic fraternity.

A PROMINENT GERMAN RUBBER MAN.

The last copy of the *"Gummi-Zeitung"* to hand contains the news of the death at the age of 68 years of Commercial Councilor Friedrich Bayer, second chairman of the board of the Farbenfabriken Friedrich Bayer & Co., in Leverkusen, near Cologne, and son of the founder of the enterprise.

UNITED STATES IMPORTS AND EXPORTS—NEW CLASSIFICATION.

Tables showing the imports into and the domestic exports from the United States in the calendar year 1919, stated in the terminology of the classification adopted by the International Statistical Congress, are issued by the Division of Statistics of the Bureau of Domestic and Foreign Commerce.

Quantities are shown in United States denominations and values in dollars and in "Pan Americanos," a proposed international money of account equal to one-fifth of a dollar. The import values represent the wholesale price of the merchandise at the time of exportation in the foreign countries from which imported, including the value of containers. The value of exports represents the cost of the merchandise at the time of exportation in the ports of the United Staes from which shipped. The ton equals 2,240 pounds.

The classification and figures relating to rubber are:

III. Materials, raw or partly manufactured.

62. India rubber and substitutes (including scrap). Unit of quantity, pound; units of value, dollar and Pan Americano.

		Value.	
Calendar year 1919.	Pounds.	Dollars.	Pan Americanos.
Imports	576,708,524	221,626,122	1,108,130,782
Exports	13,362,685	1,648,931	8,244,655
IV. Manufactured articles.			
132. Rubber manufactures.			
Imports		1,004,051	5,020,255
Exports		46,950,625	234,753,125

PRINTERS' ROLLERS OF RUBBER.

It has been known for more than a generation that the printer's roller is an unsatisfactory product. Made of glue, molasses and glycerine, it spread the ink well, but was subject to changes of temperature and must be often renewed. Makers of these composition rollers all had their own special formulas. The simplest were about equal parts of glue and molasses for summer but for winter twice as much glue as molasses. One formula called for the addition of a little Paris white, while another maker added linseed oil, whiting and rosin.

From time to time rubber manufacturers sought to oust the glue and molasses roller by supplying one of rubber. For a long time these attempts were futile. Success has, however, at last been attained.

The B. F. Goodrich Co. are now supplying a roller of rubber, the "One-Set," that is soft and pliable, not destroyed by ink, distributes perfectly, is unaffected by winter's cold or summer's heat, requires no adjusting when properly set, and outlasts by a big margin the old-time roller. Another signal triumph for rubber.

BENT RIMS CAUSE MUCH TIRE TROUBLE.

Many motorists, were they to examine the wheels on their cars, would be surprised to notice that their rims are bent along the edges. Bent rims are a direct cause of rim cuts, of tires blowing from the rim, and of the breaking of the wire cables at the base of the tire.

When the wheel hits a frog or a switch of a street car track or a hole in the road, there is a tendency to flatten the rim, especially if the tire is under-inflated. The support of the rim is essential to the life of a tire. If it is bent so that it does not fit the tire and allows the sidewalls to bulge, trouble is to be expected unless immediate precautions are taken.

The Miller Rubber Co., Akron, Ohio, issues a timely warning that by truing-up their rims, motorists can prevent much tire trouble. A good rule to follow is to have both tires and rims inspected fortnightly. When rim trouble is found, it may usually be corrected by careful tapping with a ball hammer.

The State Savings & Trust Co., Akron, and the Merchants National Bank, Massillon, have been appointed receivers of the Biltwell Tire & Rubber Co., Barberton, Ohio, due, it is said, to money stringency, though the company claims solvency.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

TRADE generally shows a falling off from the activity of last year and the opinion is freely expressed that we are in for a period of slackness all around. Another claim for increased wages is confronting the managements of the works and the indications are that the matter will not be easily settled.

The development of rubber planting on the Amazon is a matter of interest to many besides those primarily concerned. The increase in the yield in the last ten years shows the latent possibilities of this district in the future for making up any deficiencies in the Eastern supply which may be caused by the spread of pests like the worm pest. This appears to be unknown in Brazil where the main bar to progress seems to lie in transport and labor difficulties, which will have to be overcome if the rubber is to compete economically with the product of the Far East. With regard to quality, I have not seen any definite statement as to whether the Brazilian plantation rubber ranks equally with the product of the wild trees in the same locality. If it does, then it would follow that the age of the tree is not a prime factor. But if it does not, one would still expect the plantation rubber grown in its original home and presumably coagulated by the native method to be free from the irregularities associated with the Far Eastern product.

Certain seers predicted a shortage in the supply of raw rubber for the world's requirements during the current year. There is no sign of this yet, judging by market quotations, and it may be taken that until world conditions get back to normal—always supposing there are not a series of revolutions—what may be considered the legitimate trend of trade will not be observable. No doubt a lot of people want rubber in some form or other, but they have got to pay for it and this is just where the difficulty comes in.

There is general agreement among manufacturers that business is very quiet at present and buyers seem to be waiting until sales are forced by the difficulty, monetary or otherwise, of holding large stocks. An interesting market feature which is causing comment is that Fine Hard Pará is quoted within a half penny of the price of plantation rubber and I have heard the opinion expressed that the demand will go up. It seems doubtful, however, if this will eventuate, because if both were purchasable at, say two shillings per pound, allowing for the loss on washing alone, the Brazilian would be two shillings sixpence per pound and the now increased cost of washing and drying have to be added to this.

A matter which is of deep concern to the trade is the recent death of W. G. Wilson, secretary of the India Rubber Manufacturers' Association and Joint Secretary of the National Joint Industrial Council of the Rubber Manufacturing Industry. Mr. Wilson was only forty-four years of age and there can be little doubt that he over-taxed his strength in his devotion to the interests of his duties during the strenuous times of the last few years. It will be by no means easy to fill his place.

UNITED RUBBER PRODUCTS CO., LIMITED.

The United Rubber Products Co., Limited, which has a capital of £250,000 in shilling shares, owns the Urpco works of the New Urpco Rubber Co., Manchester, and has lately obtained control of the rubber works of G. W. Laughton & Co., Limited, of Clayton, Manchester. A certain amount of mystery attaches to the business which is being carried on, this being associated with some recent method of utilizing waste rubber. Louis Alexander, who was prominent in the promotion of the Sorbo Rubber Sponge Co., is the leading spirit of the United Rubber Products Co., Limited.

CALLENDER'S CABLE CONSTRUCTION CO., LIMITED.

Callender's Cable Construction Co., Limited, showed an increased profit of £161,524 in 1919 and has paid 15 per cent against 12½ per cent in 1918. As the works at Eritt, London, and Leigh, Lancashire, are now relieved of special government work the additional plant and buildings which were erected during the war period are now available for the largely increased ordinary business. In order to finance this a new public issue of £400,000 Preference shares and £100,000 Ordinary shares has been made, the former at par and the latter at £1.2*s.* per share. It is stated that the sales for 1920 are double those for the same period of 1919.

CARRIAGE OF DANGEROUS GOODS.

A memorandum has recently been issued by the Board of Trade with reference to the carriage of dangerous goods on board ship and there are several references not without interest to the rubber trade. Not for the reason that the rubber manufacturer ships his own chemicals or is responsible for the safe carriage of goods which come from overseas, but rather because the remarks in the text are of general import. Thus with regard to carbon bisulphide it is stated that the vapor has a tendency to travel and if it finds its way to any surface sufficiently warm to ignite it the flame will flash back and ignite the liquid. This has occurred at twenty feet from the warm surface. The mere striking together of two pieces of iron within the inflammable atmosphere may cause ignition.

Aniline oil is stated to give off vapors which are poisonous if inhaled for some time. "Some time" strikes one as rather too indefinite. It is interesting to note that nothing is said regarding reclaimed rubber although some of the shipping companies decline to carry it, without much reason, in my opinion. The association with oil has raised the bar, as so many oiled materials are liable to spontaneous combustion. In the memorandum it is recommended that cases containing oiled goods intended for exportation as merchandise should be perforated or otherwise ventilated. When oiled materials are used for packing, care should be taken to see that they have been properly dried and that the various folds do not overlap in such a way as to bring several thicknesses of the material together. If oiled clothing has been seasoned for at least a month after manufacture and is packed in hermetically sealed metal lined cases there should be no risk of spontaneous combustion. With regard to this it would be interesting to know if any cases of fire have occurred in the case of oil clothing in transit since the large expansion of the business in recent years.

It is stated that spontaneous combustion in the case of lampblack is extremely rare, but as there is a possibility of its taking place it should be kept protected from the wet. With regard to this somewhat disputatious matter, all I can say here is that spontaneous combustion of lampblack was not so extremely rare in rubber works in the past, whatever may be the case to-day. But a great deal depends upon the exact nature of the lampblack or what is sold as lampblack, some blacks being much more liable to fire than others. The Board of Trade is advised that india rubber solution comes under the heading of dangerous goods, and that it must not be treated as general cargo and covered with other goods. It may be shipped under deck provided it is made up in small collapsible lead tubes or in one-quarter and one-pound tins packed in sawdust in tin lined cases. The same precautions are to be taken with solutions of gutta percha in tetrachloride of carbon, because, although it is non-inflammable, it is an anesthetic like chloroform.

DUMPING.

What exactly is dumping? Definitions seem to vary according as to how the imported goods affect the individual pocket. On June 9 in the House of Commons the Under Secretary for the Board of Trade was questioned as to whether the dumping of French and American tires had caused the dismissal of 800 workmen at the Wood-Milne works, Leyland, and was further the cause of other manufacturers slowing down their output. A further question was whether the Government's anti-dumping legislation would be quickly introduced. On the latter point the answer was to the effect that no statement was possible at present. With regard to the general question, the Under Secretary said that he was not satisfied that the home industry was seriously affected nor had he any evidence that foreign tires were being dumped in this country. Obviously he does not treat the term sold as being synomymous with dumped, as his questioner seemed inclined to do. He also added that the export of rubber tires in the first five months of this year had exceeded the imports by about £600,000, while in 1913 the imports exceeded the exports by about £470,000. As the American invasion had not at that time gathered strength the total must have been mainly made up of French, German and Russian tires.

THE KING'S BIRTHDAY HONORS.

Among the recipients are one or two names known in the rubber trade. The knighthood bestowed on H. A. Wickham, as father of the rubber planting industry, is an honor which has been generally acclaimed. There is no need here to recapitulate the deeds in the earlier life of the recipient, as they are to be found in the rubber literature.

Philip S. Stott, who received a baronetcy, is a Lancashire man well known as a cotton mill architect. His connection with the rubber trade is not very close, but as a director of the large Dunlop Cotton Mills he may be said to be in touch with the industry.

W. H. Veno, who received a knighthood, is in somewhat the same category; although in business he is a manufacturing druggist, he has for some time had large financial interests in rubber manufacturing, being at the present time a director of the Monarch Rubber Co., Limited, of Manchester.

Mention may be made also of John Henderson Stewart, who receives a baronetcy. Although best known in other spheres of industry, he is chairman of the Sorbo Rubber Sponge Products, Limited, of London, a company which is now building a large new works at Woking, Surrey.

POTTERS ASBESTOS CO., LIMITED.

This concern, which has works at Rochdale and the neighboring towns of Littleborough, has been taken over by Bells United Asbestos Co., Limited, and some of the new machinery has been transferred to the works of the latter company at Harefield, Middlesex. The share capital of Potters is £68,600, and the chairman is Frank Turner, who is not now connected with the well-known asbestos concern of that name. The directorate of Bell's United Asbestos Co. is to be increased and Frank Turner will have a seat on the board. The Bell's United Asbestos Co. for last year paid a dividend of 12½ per cent, added to which was a bonus of 5 per cent.

LOUIS MINTON.

The business arrangement which has been in existence for many years between Louis Minton and Messrs. Typke and King, rubber chemical manufacturers, of London, has recently been terminated. Mr. Minton, however, will continue at Trevelyan Buildings, Manchester, to cater for the rubber manufacturers' requirements in raw and reclaimed rubber, pigments, substitutes, accelerators, sulphur and other chemicals. Having been, prior to 1898, a rubber manufacturer, he can claim with reason to be in a special way qualified to supply goods suitable for the different branches of the trade.

ZAMA, LIMITED.

This company, which carries on a proofing business at Pendleton, Manchester, has recently been sold to Thos. Mellor & Sons, of Portland street, Manchester. During the war the spreading machines were fully engaged on special work, but latterly all classes of proofing for the trade have been undertaken. J. E. Baber, who has had considerable experience in the proofing industry, will act as manager under the new regime.

CHESS-BRAND, LIMITED.

This firm has gone into voluntary liquidation and the business of rubber sole and heel manufacturers will be continued at the works, which are situated at Middleton, Lancashire, by a new company called Chess & Stead, Limited, with George Metcalfe as managing director. The new company will also operate the Chess-Brand works at Strand, Gloucestershire, these having now passed into their possession with the Middleton works. These latter, it may be recalled, were started by Mr. Roberts when he was head of the Wood-Milne Co., Limited.

J. HALSTEAD & CO.

This firm at Crow Oak Works, Whitefield, Lancashire, is among the more recently started proofing works doing proofing for the trade. G. C. Pratt, who has had many years' experience on the rubber side, is proofing manager.

NOT DUMPING TIRES ON BRITISH AUTO MARKET.

According to the American Chamber of Commerce in London, it is understood that large quantities of American and French tires were being dumped on the British markets to the disadvantage of British manufacturers. Information given by the secretary to the Board of Trade, in reply to inquiries made by Members of Parliament, show that during the first five months of this year the export of tires exceeded in value the imports by over £600,000 sterling, and in the corresponding period of 1914 imports exceeded exports in value by £470,000 sterling.

The inquiries, says the American chamber, emanated from the report that a well known firm of tire manufacturers found it necessary to dismiss a large number of their workmen, and this was attributed to the dumping of foreign tires.

RUBBER GROWERS ASSIST RUBBER EXHIBITION.

The Fifth International Exhibition of Rubber, Other Tropical Products and Allied Industries and the International Rubber Congress to be held in connection with it at the Royal Agricultural Hall, London, in June, 1921, will receive the hearty support of the Rubber Growers' Association, as in 1914. Special committees are being appointed to deal with competitions, the plantation rubber section of the international congress and other matters. A rubber tennis court will again be a feature of the associations' exhibits. Sir Ernest Birch, K.C.M.G., is chairman both of the Rubber Growers' Association's special exhibition committee and of the committees for the exhibition organization. The exhibition offices are at 43 Essex street, Strand, London, W. C. 2.

BRAZILIAN SHIPPING FACILITIES WILL BE IMPROVED THROUGH the inauguration of monthly services by the Pacific-Argentine-Brazilian Line of San Francisco and the Lloyd Royal Belge Steamship Co. of Belgium. Steamers of the first-named company, after stopping at west coast ports, will call at those in Argentina, Uruguay and Brazil, and return by way of the Panama Canal. Those of the Belgian line will call at Antwerp, Rotterdam, Amsterdam, Hamburg, Brazilian ports, Montevideo, and Buenos Aires.

THE BUREAU OF EDUCATION IN THE PHILIPPINE ISLANDS IS planning a course of athletic training that will require every public school to invest in athletic equipment. The increasingly popular games of baseball, indoor baseball, volley ball, soccer, golf, handball, and tennis are to be included.

The Rubber Industry in Germany.

By a Special Correspondent.

PUZZLED is the expression that exactly describes the state of mind of our rubber manufacturers at the present time. They are puzzled that prices should decline in a market that has shown a rising tendency; they are puzzled about the fluctuations of the exchange value of the mark, and they are puzzled about the attitude of other markets toward Germany. These three problems have created a nervous tension that expressed itself in a renewed disorganization of the market which first appeared early in June and has steadily increased ever since. Much of the existing apprehension, no doubt, might be allayed if the German manufacturers were in full possession of the facts. But the news service is still very unsatisfactory, and, moreover, the Germans were never known to read foreign news with an unbiased mind. The trouble started with the sudden advance in the value of the mark in New York and other leading trading centers of the world. True, the recovery was not particularly striking and had been long talked of by every German merchant and manufacturer. But it seems that no one really expected it to happen. As all quotations for raw materials in Germany at the present time are based on foreign exchange, the increased price of the mark naturally had a depressing effect on prices. That means the mark which had had a value, say of 2 cents in the past, suddenly jumped to double its purchase value and the prices came down accordingly.

EFFECT OF ADVANCES IN GERMAN EXCHANGE.

The whole occurrence, of course, had nothing to do with the inherent purchasing value of the mark or the quality of the goods, but it naturally tended to unsettle prices generally. Values have been exceedingly high all through the period of reconstruction in Germany and Austria. In Austria no proper price quotation seems to exist at all. However, Vienna has felt the effect of the recovery of the mark through heavy fluctuations in values.

Steps are now being taken in Germany to bring the value of public services such as transportation, postal service, etc., into better relation to the actual value of the mark, and it is to be expected that this will soon lead to some sort of price stabilization. Only quite recently the Imperial Post Office settled the new rates for letters and other mail. Ordinary letters that formerly cost 10 pfennig are now costing 40 pfennig. Postal cards now cost 30 pfennig instead of 5 pfennig. The Post Office, therefore, assumes that the value of the German mark has depreciated approximately to one-fourth or one-fifth of its pre-war value. Naturally such an increase in postal rates has its bearing upon the whole price situation in the country. It affects mail advertising and the transaction of all business.

How upset are price quotations at the present time in Germany and Austria can be seen from the fact that tennis balls have been selling in Vienna for 200 to 300 kronen each, which is between $40 and $60 pre-war exchange. Automobiles were sold a short time ago in Vienna for the phenomenal sum of one million kronen, $200,000 old exchange, but have come down now under the influence of the exchange recovery to half a million kronen. Raw material prices, of course, are all in the air. Rubber is quoted on the basis of American or English prices with the exchange fluctuations as the basis of the transaction, which makes the price change practically every day. Hemp yarn which sold for 32 cents a kilogram former exchange, is now not to be had at much below 36 marks or $9 old exchange. Cotton yarns for weaving tire fabrics and similar materials have gone up to 150 marks a kilogram, $36.00 old exchange, against a matter of 35 cents in the past. Still more pronounced are the price increases in such materials as asbestos; the best crude is now being sold at 150,000 marks a ton, compared to 1,300 marks before the war. No wonder that great efforts were made to introduce substitutes. Substitute yarns made from old rags have been offered and new fiber plants have been tried out to replace hemp and cotton. For a while it was the fashion to think these substitute materials were superior to the real article. Since the return of peace, however, the mask has been dropped, and manufacturers admit that the substitutes have been a flat failure in most instances and that the industry will require standard materials if it is to continue manufacturing on a profitable basis. Today, wherever the German substitute-made article meets rubber goods made abroad from standard materials, the German goods lose out, even in the domestic market. This is a very serious matter for the German rubber industry and there is no doubt that steps will have to be taken to make available sufficient quantities of standard raw materials if the industry shall ever recover again. This also has considerable bearing upon the future of German rubber exports.

FOREIGN RUBBER TRADE DESTROYED.

Right after the signing of the armistice German rubber manufacturers were very hopeful for the resumption of their former export trade. The sentiment of France was then not fully realized and the Germans believed that they would be allowed to enter the community of nations again on equal terms. These expectations have now been destroyed, and nearly two years have passed in which the rubber industry has been retarded and its difficulties intensified. It is now recognized that the foreign trading organization of the German rubber industry is completely destroyed. The well equipped agencies in enemy countries have been sold, as for instance the fine London business of the Continental company, and it has not been possible to keep up agencies in neutral countries owing to the high cost entailed. Shortly after the signing of the armistice German manufacturers made attempts to get in touch with some of their customers. They found, however, more competition than had been expected and that the American rubber industry especially had gained ascendency in foreign business. The Germans, therefore, will have to rebuild their rubber business entirely, and the question has been discussed whether under such circumstances it would be better to give up exporting entirely. This, however, is a difficult accomplishment.

RUBBER INDUSTRY HANDICAPPED.

The German rubber industry has invested heavily in equipment and buildings that could not be turned easily to other purposes. Also, Germany has nearly 80,000 men trained in rubber manufacturing for whom no new employment could be found. The German system of training industrial labor, although very efficient in the production of high-class operatives, has the disadvantage that it makes specialists who cannot change over easily from one industry to another. To reduce rubber production would therefore spell unemployment for a large number of excellently trained men, which is a thing to be avoided at any cost. This problem is still more complicated by the fact that sales in many of the best paying branches of the rubber industry are declining heavily. Germany has to pay off an enormous debt and the Germans will be poor for many years to come. Under such circumstances it has become a necessity to cut down all expenditures for luxuries. The time has come when the possession of an automobile is not quite the thing and statistics seem to indicate a rapid decline in the sale of automobiles. The automobile business in consequence is expected to decline heavily during the coming years. It is not quite clear whether the demand for bicycle tires will recompense sufficiently the industry for its loss in sales of the more costly article. Another difficulty

to be faced in this respect is the rising cost of production. The low value of the mark not only makes the purchase of raw materials difficult, but measured by international standards Germany today buys much more expensively than any other country of the world. It follows that each article carries a severe initial handicap in manufacturing cost that cannot be overcome easily. Under such circumstances it is rather astonishing to see that the German Government seems to be inclined to cut down export activities still further by creating a special taxation of export values for the purpose of raising the German revenues. This matter is now under consideration and rubber manufacturers, especially, are up in arms against such a measure. Whether they will succeed is doubtful in view of the very serious financial condition of the country which calls for a practically complete divestment of all surplus property. Incidentally, there is hardly any money available for advertising purposes, and foreign advertising that had been continued by several firms during the first years of the war as a matter of good policy has now ceased entirely.

PRICES OF RUBBER GOODS PROHIBITIVE.

These export troubles are only a reflection of the more acute domestic difficulties. Here are a few instances that may illustrate the situation. All through the war and following, canning and preserving have been encouraged. There is little wasted just now in Germany. But the rubber rings used in preserving have gone up excessively in price. Formerly such a ring could be had for two cents or so. Today, 50 cents and even 75 cents on the basis of the old exchange must be paid. Also the rings are not of the former quality. The German jar-ring industry has been very active in the past and a great number of specialties were introduced to make the opening of the cans easier. Most of these specialties made opening dependent upon the tearing of the ring. In addition, they required more rubber for their manufacture. With the present prices, housewives do not care to buy such rings and the simpler forms have been introduced generally. As the rubber rings were so expensive, substitutes have been offered. These, however, have not turned out very satisfactorily as was the case with most substitutes. The present situation is that the German market is undersupplied with rings and that dealers are trying frantically to increase their stocks. Rubber jar rings today are an article bought and sold in a speculative manner as shares on the New York Stock Exchange.

PROFITEERING RAMPANT.

The same applies to belting. But the belting dealers have had a severe shock recently owing to the heavy break in prices explained in the beginning of this letter. It is suspected that a large quantity of belting has been bought by dealers for future sale at large profits; profiteering, in fact, is just as rampant in Germany today as it seems to be in other parts of the world. Now, prices have gone down and the speculators wonder what to do with their stocks. It is expected that rubber belting will find more and more appreciation in Germany as soon as a better quality can be made than is the case just now. Rubber manufacturers complain that the rubber belt has not had a fair chance during the past and that it has not been used wisely during the war. Together with the drop in the cost of belting in Germany has come a general depression of all trading, caused principally by an extensive disorganization of values. Orders are coming in very irregularly. The rubber industry has probably been hit least by this development as the dependency of the industry on foreign supplies acts as a stabilizing factor upon prices. But there is no doubt that the rubber goods dealers are becoming more and more careful and while trying to keep up prices they admit that orders are not obtained at the present quotations. The German manufacturers who are keen to continue present prices are making special efforts to keep up the spirit of the market. They point out that prices in other countries are high and that the output of rubber goods outside of Germany is also considerably below the actual demand. There seems to be some truth in this statement, as there is a noticeable falling off of foreign rubber supplies in the domestic market. For a while the "Hole in the West" and the new hole in the East offered by Danzig were giving to enterprising dealers an excellent opportunity of introducing expensive foreign rubber goods. It is astonishing that notwithstanding the financial condition of the country and the high prices that had to be charged for such goods, there was still a demand for English tennis balls. Recently no English tennis balls were to be had in Berlin at any price and our German sportsmen are losing their mental balance because the German ball is inferior in quality to the English and does not have the correct weight. This applies to many other sporting goods made from india rubber, of which large quantities had been imported immediately after the war.

INDUSTRIAL FAIRS NOT BENEFICIAL.

The spring fair in Frankfort, which has been held for the purpose of giving the German manufacturer a chance to keep up his connection with the occupied territory, has not been as successful as the autumn fair of last year. It suffered under the French occupation which then was in progress and still more under the generally disorganized transportation and traveling conditions that followed the famous Kapp revolution. The sales in the rubber section, therefore, were not very good. This section, in fact, was rather small, considering the general importance of West Germany as a rubber producer, and only surgical rubber goods were comparatively well represented. There have sprung up in Germany quite a number of these fairs destined either to aid in the sale of German goods or to help the import of raw materials. It is, however, very doubtful whether these enterprises will really benefit the importer of raw materials, as the German manufacturer is not inclined to buy in this manner, but prefers to deal with importers known to him. If American exporters of reclaimed rubber and other materials wish to get in touch with Germany, they should establish proper trading agencies to handle not only the German market but also that of Poland, Bohemia, and the former Austria, all of which seem to hold a good promise for the future.

RUBBER SITUATION IMPROVING.

The present depression in the German market will not be of very long duration. It will come to an end with the expected stabilization of the exchanges. This is indicated to some extent by the report of the Demobilization Commission, which stated that the rubber industry was comparatively busy during the first quarter of the year and had sufficient orders to guarantee a favorable occupation rate. In the technical and surgical section of the industry overtime had to be resorted to. The general situation of the industry is very much improved as compared with the same period during the preceding year, notwithstanding all present troubles.

MANUFACTURE OF SYNTHETIC RUBBER IN GERMANY DISCONTINUED.

Authentic news comes from Germany about the discontinuation of the manufacture of synthetic rubber by the Farben fabriken vorm. Friedrich Bayer & Co. This company had built during the war a large plant for the manufacture of synthetic rubber in Leverkusen and it had become possible to produce considerable quantities of substitute rubber. Part of this rubber has been used during the war by the German army for tires and for a while German scientists and economists were very hopeful that the manufacture of synthetic rubber could be firmly established in Germany. During the recent general meeting of the shareholders of the company it was announced that the company has

closed its Leverkusen rubber works and does not intend to continue the manufacture of synthetic rubber as part of its activities. The rapid rise in the cost of acetone and aluminum has increased the cost of production as such a rate that today the price of the synthetic rubber exceeds that of the natural product. The company discontinued manufacturing immediately after the cessation of hostilities and the existing stocks of the material were sold out.

NOTES OF THE TRADE.

The depression in the German rubber goods market continues. All branches of the industry are finding their market considerably curtailed and evidence of overstocking in the retail market begins to appear everywhere. The manufacturers of surgical rubber goods who had been fairly busy during May and June now begin to feel the slump, and complaints are heard about cancellation of orders. The cause of the present difficulty in the surgical rubber industry differs somewhat from that in most other branches of the rubber industry. The demand for surgical rubber goods has naturally been very active immediately after the war and the dealers in consequence have been in the habit of carrying much larger stocks than would be necessary in normal times. They find now that they cannot dispose of the expected quantities and naturally try to reduce their commitments. Surgical rubber goods have been sold at rather excessive prices by the dealers and there is no denying that a certain amount of profiteering has taken place in this line. The trade associations have realized this fact and while they have urged high prices during the former shortage they are now recommending reductions amounting to 33 and even 50 per cent.

Another branch of the industry is feeling the situation very acutely—namely, the makers of sporting goods and toys. The number of rubber toy manufacturers declined during the war because no rubber was obtainable. Sporting goods still have been made but in reduced quantities. When the war ended the industry tried to pick up its old connections again and the results of the first trading fairs seemed to be most promising. Large orders were received from abroad and the aspect was pleasing enough. The last weeks, however, have proved a decided disappointment. The German rubber toy industry has gained its influence by the high quantity of its production as well as by the cheap price for which the goods have been sold. It appears now that the output of more recent times has not been very satisfactory and that, in consequence, orders have declined. Also the price of the toys has reached a level which makes the German industry less competitive than in the past.

The Bureau for the Control of Foreign Trade in Rubber Materials and Rubber Goods (the *Aussenhandels Nebenstelle Kautschuk*) has now commenced operation. It is in charge of Walter Lindemann, the manager of the central union of German rubber goods manufacturers. The work of the Bureau will be guided by the following principles: the import of raw rubber, gutta percha, balata, and scrap rubber, is free from all restrictions and, therefore, is not subject to the control of the Bureau. The import of manufactures of rubber and goods for further use in manufacturing is in principle prohibited. Exceptions will be made in the case of such goods as are urgently required for the continuation of German economic life and cannot be manufactured in Germany or cannot be had in a reasonable time. The importer will have to prove the urgency of his request. The import of reclaimed rubber is limited to 5,000 tons in all. The import of factice is not permitted unless proof is provided that the required quantities or qualities cannot be had in Germany.

The export of raw rubber, gutta percha, balata, and scrap, is permitted. The export of manufactures of rubber is permitted as long as the price is not below the domestic minimum prices. The export of reclaimed rubber is permitted. The export of factice is permitted with the exception of such qualities as are manufactured by the use of rape-seed oil. Exception can be made under certain circumstances. The exporter may bill his export goods either in German or foreign money units.

The *Liga Gummiwerke Heinrich Peter & Co., G. m. b. H.*, in Frankfort-on-the-Main, has increased its capital to 3,000,000 marks.

The *Continental Caoutchouc und Guttapercha Compagnie* in Hanover has increased its capital from 15,000,000 to 34,500,000 marks.

The *Ungarische Gummiwaren Fabrik A. G.* in Budapest, Hungary, has increased its capital from 6,000,000 kronen to 10,000,000 kronen.

FOREIGN NOTES.

FRENCH EQUATORIAL AFRICA exported 2,221,133 kilos of rubber in 1919, as compared with 1,980,723 kilos in 1918 and 1,756,436 kilos in 1913, the year before the war.

France's exports of rubber manufactures in 1919 amounted to 226,000,000 francs in value. The figures for previous years are:

1918 .... *francs*	96,000,000	1915 .... *francs*	80,000,000
1917 .... *francs*	117,000,000	1914 .... *francs*	85,000,000
1916 .... *francs*	108,000,000	1913 .... *francs*	100,000,000

To the Alsace-Lorraine production much of the increment is due.

Denmark imported in 1919 rubber of the value of 115,000,000 kroner.

Holland in the first quarter of 1920 did a less satisfactory business in rubber tires than in the year before, because exportation was made more difficult and the importation of foreign tires was made easier. On the other hand, no complaint is to be found as regards the manufactures of technical and sanitary rubber goods other than dock and transportation strikes. Imports of tires for the quarter amounted to 3,145,551 gulden and exports, to 147.411 gulden. Imports of raw rubber amounted to 2,126,672 kilos, of which 2,022,578 came from the Dutch East Indies and 19,940 kilos of balata from Curaçao. Exports of rubber amounted to 1,655,043 kilos, of which 1,085,983 kilos went to the United States, and besides 20,393 kilos of balata were exported.

A company has been registered in Bombay, India, as "The Pioneer Rubber & Industrial Co., Ltd.," with a capital of £500,000 English, (50 lakhs of rupees), to reclaim waste rubber and manufacture rubber goods, such as tires, tubes, surgical goods, heels, waterproof clothing, and ebonite. Sir Fazulbhoy Currimbhoy is chairman of the board of directors, and Manu Subedar & Co. are the managing agents.

CORD TIRES TO BE MADE IN CUBA.

RAUL GODOY.

The Cuban Tire & Rubber Co. (*Compañia Cubana de Zunchos y Goma*), Havana, Cuba, said to be the pioneer tire factory in Latin-America, was incorporated in August, 1916, with an authorized capital of $1,750,000 for the manufacture of tires, tubes, and other rubber goods.

Under the efficient guidance of Raul Godoy, general manager, the company has steadily progressed and is now making 150 fabric tires, 500 tubes, some heels, and mechanical goods for the sugar centrals. Appreciating the necessity of adding cord tires to the company's products, Mr. Godoy recently spent six months in the United States acquiring the necessary technical information and mechanical equipment for making high-grade cord tires.

News from British Guiana and Trinidad.

Special Correspondence.

FRANK DAPHNE, the solicitor to the Essequibo Rubber & Tobacco Estates Defence Committee, has issued the final report and audited accounts to the subscribers to the fund.

There was complicated and protracted litigation and the winding up of the company was not completed till 1919, but in the end the subscribers to the fund, about 300 in number, have received a return (including an interim distribution in 1915) equivalent to 7*s.* in the £ on the amount they paid for shares. They are to be congratulated, for unfortunately proceedings of this kind rarely terminate so satisfactorily. It should be added that only shareholders who subscribed to the fund benefited from the efforts of the committee.

The company was registered in Georgetown, British Guiana, on April 6, 1910, with a nominal capital of £100,000 in five-shilling shares, to acquire the benefit of four licenses granting the right to collect rubber, balata and like substances over an area of 200 square miles of the Crown Lands in British Guiana and to develop the land as a rubber, tobacco, and general produce estate. The licenses were granted to J. M. Ho-A-Hing on June 5, 1906, for a term of 10 years at an annual total rental of $80, and a royalty of two cents on every pound of rubber or balata collected. The nominal promoter of the company was the Industrial Selections, Limited, who received £4,500 for preliminary expenses but the actual promoter was Joseph Chansay, the beneficial owner of practically the whole of the issued capital of Industrial Selections, Limited. The first directors of the company were Sir Henry E. Dering, Bart., J. P., Sir Henry Seton-Karr, C. M. G., Captain W. J. M. Hill and William O'Malley, M. P.

Captain Hill resigned on June 30, 1911, and P. Halcrow was appointed in his stead on February 7, 1912. On February 23, 1912, Sir Henry Dering tendered his resignation which was accepted on March 4.

The 400,000 shares comprising the nominal capital of the company were offered for subscription at par by a prospectus dated April 13, 1910, and published by the "Financial Outlook," which unhesitatingly recommended the company.

The company's affairs were ordered to be wound up on June 25, 1912, on the petition of six shareholders (1,480 shares) supported by 28 other shareholders (5,185 shares), presented on May 4. The statement as prepared by the directors disclosed a deficit of £68,992.4*s.* 5*d.*

The property of the company was sold at auction in August, 1912, when a private offer of $16,800 by W. L. Seymour, the representative of an English syndicate, was accepted for the Liberty Island Estates held under a 99 years' lease from the Government.

A prominent British Guiana journal, dealing with the above, recently said:

The announcement that the subscribers to the Essequibo Rubber & Tobacco Estates Defence Fund are to receive a dividend of 7*s.* in a pound recalls the rubber boom of almost a decade ago, when British Guiana was to share in the fabulous wealth then being won from this industry. Enthusiasm ran so high that the Department of Science and Agriculture went to the expense of producing a brochure informing the world that there were some nine million acres available for rubber cultivation in the colony and that the rubber grown here was equal to the best product of the East. Several companies were formed and so confident was everybody in the colony that we had a rubber industry that we even had the temerity to exhibit at the Rubber Exhibition in London. That the boasts of the Department of Science and Agriculture as to the quality of British Guiana rubber were not idle was borne out by the fact that the colony carried off two cups. Unfortunately many of the companies that were formed were sponsored by busy speculators, who were far more anxious to grow rich quickly than they were to make money honestly by the development of an industry that had the best of prospects —and still has.

The boom soon collapsed and the rubber industry of British Guiana became such a minor affair as to be forgotten for all practical purposes. It had not altogether died, however, for in 1918 the exports reached the total of 23,854 pounds. This was not a great contribution to the world's supply, it is true, but still sufficient to justify the assertion that the industry is alive. In the long run it will probably be found a good thing that the foundations of the industry were not laid in the treacherous quicksands of a boom. When it does take its proper place in the industrial economy of the colony it will not at any rate owe its very existence to an abnormally inflated price of 12*s.* 6*d.* a pound, and the time may come when this colony will be able to sell its rubber in the markets of the world at the world's price. At present, according to the representative of one of the largest rubber cultivators in the colony, owing to labor shortage and leaf disease, it is not possible to tap the colony's rubber trees at a profit. The price in London to-day is ruling at only 2*s.* 3*d.* a pound, and it is held that with the high price of labor it is impossible to compete with the East.

MULTIPLE "V" TAPPING, RICHMOND ESTATE, TOBAGO.

It is interesting to glance for a moment at the progress made in Trinidad, which was also to become a "rubber country" a few years ago. Trinidad has not become a rubber country, but its industry has developed better than ours and there seems to be a little more optimism about it than there is here. The exports in 1919 amounted to 41,000 pounds and the industry evidently had sufficient life in it to be worthy of discussion by the excellent Agricultural Society that looks after these things in

Trinidad. (Incidentally, we have nothing quite like the Trinidad Agricultural Society in the colony.) This discussion elicited the fact that the Department of Agriculture in Trinidad has not abandoned its experiments with rubber, as we believe is the case in this colony. The Director of Agriculture gave some particulars of tapping experiments that are of great moment because they go far to meet the principal difficulty in this colony, namely the labor shortage. *Hevea* trees are supposed to require tapping every other day. Mr. Freeman resolved to try a series of experiments, tapping every two days, and every six. The results were more than gratifying. The trees tapped three times a week yielded 22½ pounds a tree in 4½ years, those twice a week 19.3 pounds and those once a week 9.2 pounds. Thus, by tapping three times in two weeks instead of six times they get a yield only of 3 pounds less per tree in 4½ years. The importance of this experiment upon the labor difficulty is obvious. Trinidad is fortunate in having a rubber enthusiast. E. A. Robinson grows rubber, not to test theories as the Department of Agriculture does, or because it amuses him, but as a commercial proposition. In 1919 Mr. Robinson organized labor to tap 1,600 trees and produced 28,000 pounds and he got roughly 400 pounds to the acre, whereas in the East the average is as follows: southern Java 218 pounds; Straits Settlements 247 pounds; Ceylon 312 pounds; Java 322 pounds; Sumatra 326 pounds; and in one district of the Federated Malay States 382 pounds. In the East, rubber is clean-weeded, forked and manured; in Trinidad Mr. Robinson does nothing but drain his land. For labor he uses boys and girls, also adults of both sexes, and pays them 40 and 50 cents a day. As they can do a day's task of 200 trees by 11 o'clock they can make much more money with extra work. Mr. Robinson is an exception. It is not believed that rubber can be grown profitably in Trinidad any more than it is believed that it can be grown profitably in this colony. Nevertheless he is planning to produce 70,000 pounds of rubber this year. We should not be surprised if the foundation of another big industry is being laid in Trinidad.

MALAYAN CRUDE RUBBER INDUSTRY IN 1919.

By Consul General, Edwin N. Gunsaulus,

Singapore, Straits Settlements.

THE ANNUAL REPORT of the Planters' Association of Malaya for the year 1919, presented at a meeting of the Association held a few days ago, contains much interesting information relative to the rubber industry during the period under review. Some of the more salient points of this report are given below:

The year 1919 commenced with heavy stocks in this country, and in many directions fears were expressed as to the ability of the manufacturers to absorb them. Crop restrictions were relaxed during the first part of the year and the shortage in shipping did much to augment this. A great deal of speculation resulted on the signing of the armistice and temporarily affected prices in Singapore, but the removal of the American import restrictions brought a more steadying influence to bear on the position, and in the ensuing months of the year matters adjusted themselves more nearly to a resumption of the natural law of supply and demand.

The output of rubber in Malaya during 1919 and the previous three years was as follows:

Provinces.	1916.	1917.	1918.	1919.	Increase in 1919 over 1918.
	Tons.	Tons.	Tons.	Tons.	Per cent.
Selangor	26,163	32,614	31,417	39,570	26
Perak	23,421	30,129	30,219	41,580	37
Johore	14,004	19,089	22,816	27,890	22
Malacca	12,388	16,075	16,693	22,414	34
Negri Sembilan	12,179	15,526	15,154	22,846	50
Penang, Province Wellesley and Dindings	4,935	5,596	5,762	8,089	40
Kedah	3,314	5,266	5,276	6,472	22
Singapore	628	2,471	2,600	3,200	23
Pahang	1,001	1,562	1,494	2,457	64
Kelantan	1,010	1,490	1,745	2,077	19
Trengganu	20	105	188	244	29
Total	99,063	129,923	133,364	176,839	32

RUBBER PRODUCTION.

During the past 11 years the total production has been as follows:

Years.	Tons.
1919	176,839
1918	133,364
1917	129,923
1916	99,063
1915	70,214
1914	47,006
1913	33,641
1912	20,327
1911	10,782
1910	6,504
1909	3,340

FOREIGN COMMERCE IN RUBBER—WORLD PRODUCTION.

The export figures for 1919 are interesting when compared with the production for the year, as they show some 22,918 tons more were shipped than the total of the Malayan crop, while at the end of 1918 only 6,312 tons are given as having remained unshipped.

The Board of Trade returns for 1919 give the total imports of rubber to the United Kingdom at 101,891 tons, of which amount 58,132 tons were supplied by the Federated Malay States and Straits Settlements. On December 31 stocks of plantation grades at London and Liverpool amounted to 23,236 tons. In ten months ending October, 1919, the United States took 124,339 tons of rubber from the British Indies, an increase of 30,904 tons over the amount supplied during the corresponding period in 1918.

According to Rickinson's "World Rubber Position," the world's production of plantation rubber in 1919 was estimated at 285,225 tons, Brazilian and wild rubbers at 41,635 tons, and the amount afloat on December 31, 1919, at 47,340 tons, making a total of 374,200 tons. Of this amount 55,000 tons were produced in 1918.

SHARE OF CONSUMING COUNTRIES—TREMENDOUS INCREASE IN DEMAND FOR RUBBER.

The consuming countries in their order of importance were:

	Per Cent.
America	65
United Kingdom	13
France	6.5
Italy, etc.	4
Canada	3
Japan and Australia	3.5
Russia	0.5
Scandinavia	2
Belgium	1.5
Germany, etc.	1

It is pointed out that during the past 10 years the consumption of rubber in the United States has shown an average increase of 27¾ per cent per annum. Should the spread of motor traction result in an annual increase in the world's consumption equal to 25 per cent, it would be necessary by 1924 to harvest from the plantations a crop of no less than 766 pounds per acre in order to meet the demand. It, therefore, follows as a safe conclusion that we are approaching a time when the supplies of raw material will not be large enough to meet the demand.

Most of the rubber produced is for the manufacture of tires, and if this demand is maintained during the next few years there will not be enough rubber available, as only the present planted area of 2,910,750 acres will be tappable during the next five years.

The *Société Anonyme des Plantations de Telok-Dalam* of Antwerp, Belgium, in its tenth annual report for 1919, announces profits of 1,691,460.74 francs. The company owns 4,405 acres of land in Asahan, Sumatra, of which 2,405 acres are under cultivation. This yielded, in 1919, 909,540 pounds of rubber instead of the anticipated 720,310 pounds; the average price obtained for it was 6.35 francs a kilo, while in 1918 the price obtained was 3.87 francs. The number of trees per acre when the company started was 105; this has been cut down to 74 and this year 5 trees an acre more will be removed. In 1918 the yield was 5.178 pounds per tree and 384.8 pounds per acre; last year it was 5.83 pounds per tree and 393.05 pounds per acre. The president of the company is E. Bunge and among the directors are A. and E. Grisar.

THE RUBBER INDUSTRY IN THE NETHERLAND EAST INDIES.

By Our Regular Correspondent.

IN CONSIDERING the prospects for Netherland East Indian agricultural products in 1920, a local authority declares that the impoverished condition of Europe will not affect trade to such an extent as might be expected, because the United States and several Asiatic countries have proved to be large consumers of colonial products.

He concludes by pointing out that the labor unrest all over the world has also invaded these parts and should not be lightly considered.

LABOR TROUBLES AND THE CURE.

The labor problem is more complex here than it is in America. Here we have not only the European employes on the estates to consider but also coolie labor. That employers and the Government, both, are alive to the need of some action is abundantly evident. The local government has just published a draft of regulations intended to benefit the European assistants of the east coast of Sumatra, and it is supposed that similar regulations will be drawn up for Java and Madura.

The regulations lay down terms concerning the working contract of an employe, stipulating that he shall have leave of absence of at least one month each year for the first six years, and foreign leave of eight months if he has been with an employer for over six years. One clause provides that any condition made by the employer to prevent directly or indirectly the marriage of an employe shall be void.

One of the foremost companies active in improving the condition of its employes is the Holland-American Plantation Co., a subsidiary of the United States Rubber Plantations, Inc., that has recently fixed salaries for field assistants as follows: beginner's salary, fl. 300 (one florin equals 40 cents) per month; after the first year this is increased by fl. 50 a month each year, until the employe has been with the concern 14 years, when he will receive a salary of fl. 800 per month. On January 1, 1920, a new ruling went into effect which provides for pensions. The maximum pension after 20 years' service and at the age of 45 years, or in case of illness making the employe an invalid, is fl. 2,400 per annum, minus 2 per cent of the bonus earned since January 1, 1918. At death the widow receives 60 per cent of the maximum pension, plus 12½ per cent for each child; this pension is also subject to subtraction of 2 per cent of the bonus earned since January 1, 1918.

Other rubber planting companies that have provided pensions for their employes are the Deli-Batavia Rubber Co.,—fl. 1,000 per annum after 18 years' service; the Amsterdam Rubber Cultivating Co. and the Netherlands Rubber Co.—each fl. 1,200 after 18 years' service; Tjinta Radja—a lump sum of fl. 10,000 after 15 years; *Société Financière*—a lump sum of fl. 12,000 after 15 years' service.

As for the coolies, efforts are being made to abolish the recruiting system and contract labor as it now exists and to substitute so-called free labor. It is proposed to bring this about gradually, each year reducing the amount of contract labor and correspondingly increasing the amount of free labor, until all labor will be free.

TAXES.

A good deal of excitement has been caused here in export circles where "time business" is the custom, by the proposed export taxes with a sliding scale. Government officials had proposed a means of protecting time business, which would otherwise receive unfair treatment under a sliding tax scale. It appears, however, that the remedy is worse than the disease, for the proposed protection—an export permit subject to innumerable conditions—is so bound up in red tape that instead of being protected, time business would be seriously hampered.

Therefore, at a recent gathering at Djacja, where delegates from the chief commercial associations of the island convened to discuss the matter, it was decided to cable to the Minister of Colonies in Holland protesting against the proposed measure, and suggesting a stamp tax instead of the much debated duty.

The following table shows how the tax would be regulated on rubber:

If the market price per half-kilo of rubber is:

fl. 0.75 or less.....Nihil.
fl. 0.76 to fl. 1.50.....2½% of value.
fl. 1.51 to fl. 2.25.....3% of value.
fl. 2.26 and over.....4% of value.

In addition to this tax, the rubber shipper will have another item to deal with in making up his cost account, namely, a 15 per cent increase in freight charges, announced by the Netherlands-Indies Railways; this is to go into effect on August 1, 1920.

PRODUCTION AND EXPORTS OF RUBBER.

The International Association for the Rubber Planting Industry in the Netherland East Indies publishes the following table of the production and export of rubber for the entire Netherland East Indies during the period 1914-1918. The quantities are given in tons of 1,000 kilo (2,204 pounds).

	Production.					Exports.				
	1914.	1915.	1916.	1917.	1918.	1914.	1915.	1916.	1917.	1918.
Java .....1,000 *kilos*	3,812	7,510	13,952	18,933	23,558	3,772	7,466	13,941	18,843	17,311
East Coast Sumatra and Atjeh.....	6,586	10.135	16,374	22,219	23,901	5,279	9,583	15,404	20,789	19,538
West Coast Sumatra.....	....	89	134	153	9	....	21	....	151	9
Tapanuli.....	365	519	198	1,188	1,314	362	515	180	154	584
Benkulen.....	10	155	156	177	24	....	....	....	177	40
Lampong Districts	51	41	68	....	27	45	40	77	....	38
Palembang.....	99	141	218	317	328	7	18	102	317	270
Djambi	132	506	1,188	1,818	2,577	125	498	1,169	1,761	2,576
Riouw	299	492	792	754	1,548	119	....	....	730	1,068
Banka	30	13	57	67	4	....	6	37	....	38
West Borneo	147	402	921	1,325	1,525	128	363	728	1,325	1,385
South East Borneo.....	250	479	872	1.077	870	192	94	753	946	1,132
Totals.....	11,781	20,482	34,930	48,028	55,685	10,029	18,604	32,391	45,193	43,989

LATEX PRODUCTION AND ANATOMICAL STRUCTURE OF HEVEA.

At a recent meeting of the Rubber Planters' Association, Bobilioff discussed the formation of latex and the connection between the anatomical structure and latex production of *Hevea*. From experiments with isolated pieces of bark, he came to the conclusion that after tapping, a new formation of latex takes place, which he believes may be influenced by the presence of amylum. He further found that on the whole the best latex producers had the greatest number of layers of latex canals. In making experiments on bark, age was a great factor.

Other investigators found that while it was not always true of a group of good producers that the amount of latex produced runs parallel with the number of latex rings, this correspondence was noted when a mixed group of good, bad, and medium producers was tested. It has been pointed out that where a plantation has fared so badly that the usual method of finding good producers does not work, investigation of the bark might become a trustworthy aid in thinning.

NOTES.

During the last quarter of 1919, Djambi exported 2,057,650 kilos of rubber and 109,196 kilos of gutta jelutong. Reports about the condition of the crops were satisfactory, expansion of plantings taking place regularly.

It is reported that the Green Star Steamship Co., of New York, will commence regular service between the Netherland's Indies and New York and San Francisco.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED JUNE 8, 1920.

NO. 1,342,461. Cushion wheel. G. M. Peters, Kirkwood, Mo.
1,342,562. Tire. A. J. Meyer, Chicago, Ill.
1,342,597. Artificial palm to be worn on the hand as a foot-treating appliance. H. A. Post, Kansas City, Mo.

1,342,611. Storage battery separator and method of manufacture. T. A. Willard, Cleveland, O.
1,342,622. Split rim for tires. R. S. Bryant, assignor by mesne assignments to The Standard Parts Co.—both of Cleveland, O.
1,342,700. Toy gun operated by rubber band. J. A. Talbot, assignor to E. E. Talbot—both of Walla Walla, Wash.
1,342,731. Display stand for tires. C. W. Yelm, assignor to The Gates Rubber Co.—both of Denver, Col.
1,342,736. Self-filling fountain pen with collapsible ink reservoir. M. Borbeck, assignor to Houston Fountain Pen Co.—both of Sioux City, Iowa.
1,342,994. Bath spray. P. J. Fitzgerald, assignor to The Fitzgerald Manufacturing Co.—both of Torrington, Conn.
1,342,997. Embalming device. C. S. Harrell, Lexington, Miss.
1,343,055. Aeronautic device with inflatable pockets to be worn by individuals. J. Kropacz, assignor of one-third to J. Jakuriecz—both of Calgary, Alberta, Canada.
1,343,101. Tool with handle of insulating material. J. A. Weaver, Baltimore, Md.
1,343,108. Flame-throwing sterilizing apparatus with rubber bulb. I. W. P. Buchanan, Lebanon, Tenn.
1,343,113. Nursing bottle attachment to prevent collapsing of nipple. L. D. Clark, Waterville, Me.
1,343,154. Cushion tire. L. W. Ostmann, St. Charles, Mo.
1,343,155. Resilient tire. F. Perdala, Newark, N. J.
1,343,165. Submarine radio system with highly insulated antennae. P. E. Stogoff, New York City.

ISSUED JUNE 15, 1920.

1,343,233. Resilient tire and filling therefor. J. Stander, Brooklyn, N. Y.
1,343,310. Windshield wiper. V. H. Christen, Toledo, Ohio.
1,343,357. Pneumatic cushion. A. C. Eggers, Brooklyn, N. Y., assignor to The Goodyear's India Rubber Glove Mfg. Co., Naugatuck, Conn.
1,343,368. Material for reinforcing rubber articles and method of making same. R. F. Kingsley, East Cleveland, assignor to The Mechanical Rubber Co., Cleveland—both in Ohio.
1,343,380. Hard rubber battery jar and method of manufacture. H. Weida, Highland Park, N. J., assignor to The India Rubber Co., Erie, Pa.
1,343,383. Sole-cutting die with sheet rubber secured to outer surface to furnish unbroken surface to retain operator's grasp. T. W. Bilello, Long Island City, N. Y., assignor by mesne assignments to United Shoe Machinery Corporation, Paterson, N. J.
1,343,394. Demountable rim for tires. O. L. Ingram, Walla Walla, Wash.
1,343,418. Laminated armor for inner tubes. H. M. Stevens, Indianapolis, Ind.
1,343,521. Fountain pen. A. C. Rader, Alta, Iowa.
1,343,526. Tire support. H. M. Smith, Buffalo, N. Y.
1,343,528. Cushion heel. C. C. Stolzenburg, Elyria, Ohio.
1,343,540. Vehicle tire. J. Allend, Philadelphia, Penn.
1,343,621. Fountain pen cleaner. C. W. Garver, Ashland, Ohio.
1,343,684. Wheel cushion and means for mounting same. A. L. Runyan, Omaha, Nebr.
1,343,685. Resilient tire filler. A. L. Runyan, Omaha, Nebr.
1,343,713. Dental massage and polishing appliance with waterproof lining and elastic contracting means. C. W. Fuller, Yonkers, N. Y.
1,343,736. Hatpin guard connected by elastic band. J. B. Maserang, Belleville, Ill.
1,343,787. Syringe. E. Neil, Nashville, Tenn.
1,343,853. Hose coupling. A. Rubin, New York City.
1,343,860. Spring tire. C. E. Williams, Pittsburgh, Penn.
1,343,861. Spring tire. C. E. Williams, Pittsburgh, Penn.
1,343,890. Bulb for tank valves. A. T. Hopkins, assignor to The Mechanical Rubber Co.—both of Cleveland, Ohio.

ISSUED JUNE 22, 1920.

1,343,910. Tension device for printing-press rolls. C. T. Evans, assignor to The Cutler-Hammer Manufacturing Co.—both of Milwaukee, Wis.
1,343,949. Vacuum cup fastening means for dental suction plates. G. S. Whitaker, Gloversville, N. Y.
1,343,950. Dental suction plate. G. S. Whitaker, Gloversville, N. Y.
1,343,967. Hose coupling. H. R. Gilson, New Rochelle, assignor to New York Belting & Packing Co., New York City—both in New York.
1,344,025. Tire. F. Ditchfield, Montreal, Quebec, Canada.
1,344,028. Gasket for inflation-tube connections. A. A. Ewald, Oakfield, Wis.
1,344,079. Rubber stamp attachment. F. E. Frost, Worcester, Mass.
1,344,145. Carcass fabric for pneumatic tire. J. F. Palmer, Riverside, Ill.
1,344,337. Cushion wheel. P. H. Dorsey, Algiers, La.
1,344,346. Cushion tire. F. A. Krusemark, L. G. Funkhouser and H. G. Carpenter, assignors to K., F. & C. Tire & Rubber Corp.—all of Roanoke, Va.
1,344,349. Open face gas mask. G. A. Mickelson, Vancouver, British Columbia, Canada.
1,344,401. Pneumatic wheel with solid tire and pneumatic tube. E. B. Hudson, Middletown, Ohio.
1,344,443. Attaching means for rubber heels. J. W. Denmead, Akron, Ohio.
1,344,504. Cord fabric and rubber soles for boots or shoes, having ends of cords presented to wearing surface. J. E. Grosjean, Lima, assignor by direct and mesne assignments of one-fourth each to L. F. Montgomery, Fort Recovery, and F. L. Maire, Lima—all in Ohio. (See THE INDIA RUBBER WORLD, June 1, 1920, page 590.)

ISSUED JUNE 29, 1920.

1,344,662. Demountable rim for tires. B. Tamburello, New York City.
1,344,760. One-piece collapsible nursing bottle. W. E. Goddard, Watertown, Wis.
1,344,773. Resilient tire. W. Seidel, Chicago, Ill.
1,344,854. Tire valve. A. C. Berg, White Bear, Minn.
1,344,856. Garment supporter. G. R. Bonebright, Grand Rapids, Mich.
1,344,935. Ear drum protector. E. Baum, Philadelphia, Penn.
1,344,972. Resilient heel tread with soft rubber plugs. R. Armour, Providence, R. I.
1,344,986. Resilient wheel. A. H. Carlson, Butte City, Calif.
1,344,990. Shock absorbing wheel with pneumatic hub. R. R. à Court Beadon, Simla, Punjab, British India.
1,345,040. Hair curler with elastic band. O. E. Vandamark, Los Angeles, Calif.
1,345,046. Heat insulating fabric. F. V. Wedlock, assignor to Featheredge Rubber Co.—both of Chicago, Ill.
1,345,114. Cushion wheel. T. W. Arter, Bellaire, Ohio.
1,345,228. Tire. G. D. Pearson, Montreal, Quebec, Canada.
1,345,256. Elastic vehicle tire. W. E. Russell, Akron, Ohio.
1,345,269. Demountable rim for tires. O. Smith, Springfield, Tenn.
1,345,282. Demountable rim for tires. Victor R. Teague, Lovington, N. Mex.
1,345,313. Demountable rim for tires. W. W. Bowman, New York City.
1,345,332. Demountable rim for tires. M. Hollister, Jr., Fort Dodge, Iowa.

REISSUES.

14,900. Resilient wheel. W. A. Black, assignor to The Simplex Auto Wheel Co.—both of Spokane, Wash. (Original No. 1,277,537, dated September 3, 1918.)

THE DOMINION OF CANADA.

ISSUED JUNE 1, 1920.

200,462. Tire casing. H. E. Grabau, Long Island City, and A. C. Schwartz, New York City—both in N. Y., U. S. A.
200,510. Vehicle tire with air reservoirs. O. J. Eisele, N. Y. C., U. S. A.
200,538. Pneumatic reinforced tire. P. Huth, San Francisco, Calif., U. S. A.
200,567. Reinforced pneumatic tire. H. L. Ochs, Kansas City, Mo., U. S. A.
200,598. Ear stopper. B. T. Stair, Los Angeles, Calif., U. S. A. (See THE INDIA RUBBER WORLD, June 1, 1918, page 544.)
200,637. Solid rubber tire. The Dunlop Rubber Co., Ltd., Westminster, County of London, assignee of C. Macbeth and H. C. Young, both of Birmingham, County of Warwick—all in England.
200,644. Garter. The Kabo Corset Co., assignee of L. S. Florsheim—both of Chicago, Ill., U. S. A.

ISSUED JUNE 8, 1920.

200,780. Hat-pin protector connected with elastic band. J. B. Maserang, Belleville, Ill., U. S. A.
200,862. Vehicle wheel. The Eagle Wheel & Tire Co., Inc., assignee of J. E. Harrigan—both of New York City. (See THE INDIA RUBBER WORLD, April 1, 1919, page 369, and December 1, 1919, page 155.)

ISSUED JUNE 15, 1920.

200,943. Repair cover for pneumatic tires. F. W. Farr, Northampton, England.
201,018. Metal tire with pneumatic inner tube. J. L. A. Tetreault, Montreal, Quebec, Canada.
201,028. Cushion wheel. G. Zinsli, Sentinel Butte, North Dakota, U. S. A.
201,079. Milking machine teat cup. The Ridd Co., Limited, assignee of Ambrose Ridd—both of New Plymouth, New Zealand.

ISSUED JUNE 22, 1920.

201,106. Composite rubber and fabric top for cycles and similar saddles. J. Jelley, Coventry and H. Jelley, Birmingham—both in England.
201,184. Pneumatic rubber tire with air tight joints, etc. E. B. Killen, London, E. C. 4, England.
201,191. Device for attaching nipples, caps, etc. W. P. Limacher, Pasadena, Calif., U. S. A.
201,279. Endless belt. The Goodyear Tire & Rubber Co. of Canada, Limited, New Toronto, assignee of The Goodyear Tire & Rubber Co. of Canada, Toronto, assignee of A. M. Hardy, Bowmanville—all in Ontario, Canada.

ISSUED JUNE 29, 1920.

201,360. Spring tire. E. B. Esther, Missouri, U. S. A.
201,401. Automobile wheel with metallic tread encased in rubber. G. W. Sell, Portland, Ore., U. S. A.

THE UNITED KINGDOM.

ISSUED JUNE 2, 1920.

140,971. Self-filling fountain pen. H. A. Widmer, 32 Clerkenwell Road, London.
141,026. Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York, assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, New Jersey—both in U. S. A. (Not yet accepted.)
141,071. Fountain pen. J. Mallat, 53 Boulevard de Strasbourg, Paris. (Not yet accepted.)
141,075. Fountain pen. J. Mallat, 53 Boulevard de Strasbourg, Paris. (Not yet accepted.)

Chemical Patents will be found on pages 732, 733. Machinery Patents on pages 735, 736.

ISSUED JUNE 9, 1920.

141,167. Driving belts composed of spring metal links containing blocks of rubber, etc. E. Lycett, Bromley street, Birmingham.
141,186. Fountain pen. C. Livsey, 11 Groveland Road, Wallasey, Cheshire.
141,216. Pneumatic or solid wheel tires having sides of softer rubber than tread. W. W. Beaumont, 222 Strand, Westminster.
141,271. Fountain pen. H. A. Widmer, 32 Clerkenwell Road, London.
141,276. Parlor golf. A. H. Laing, Ardis, Watling street Road, Fullwood, Preston, Lancashire.
141,297. Pattern for making rubber baby pants. A. E. White, 88 Chancery Lane, London. (I. B. Kleinert Rubber Co., 725 Broadway, New York City, U. S. A.)
141,405. Disk wheel with wooden rim recessed to hold pneumatic tire. W. E. Beasley, Rose Cottage, Cheddington, Buckinghamshire, and W. Beedle, Cornwall Villa, Weymouth street, and H. Everett, 376 St. Albans Road—both in Watford, Hertfordshire.
141,408. Air pumps. Dunlop Rubber Co., 14 Regent street, Westminster, and H. F. Milward, 21 Bowyer Road, Alum Rock, Birmingham.
141,423. Hypodermic syringe with rubber packing around needle. S. J. Everett, 393A, London Road, Thornton Heath, Surrey.

ISSUED JUNE 16, 1920.

141,489. Rubber lined anti-splash device for faucet, etc. W. E. Bodycoat, Brookland House, Hamilton Road, Lincoln.
141,495. Pneumatic tire with sponge rubber filler. C. L. Marshall, 27 Queen Victoria street, London.
141,517. Self-filling fountain pen. A. Gilbert, 18 Shore street, and A. Roberts, 2 Gordon House, Mare street—both in Hackney, London.
141,541. Pneumatic tire with wood or metal rim closed by leather or canvas band. C. H. Southall, 7 Vicker's avenue, Kirkstall, near Leeds, Yorkshire.
141,578. Hose pipe couplings. E. S. Luard and V. P. Rawlings, 15 Dean's Yard, Westminster.
141,652. Rubber pad for protecting boot soles. F. E. Freeman, A. E. Derreck and G. L. Lovesey, Great Norwood street, Cheltenham, Gloucestershire.
141,749. Resilient wheel having solid outer tire bearing on interior rubber tubes. L. M. Campi, New York City, U. S. A. (Not yet accepted.)

ISSUED JUNE 23, 1920.

141,782. Resilient tires. F. L. Rapson, Childwall Hall, Liverpool.
141,927. Shock absorbing wheel tire with sponge rubber filler. F. L. Rapson, Childwall Hall, Liverpool.
142,014. Rubber heel. D. D. Granger, 82 South avenue, New London, Ohio, U. S. A.
142,019. Waterproof coat with lining or interlining provided with ventilating eyelets coinciding in position with eyelets on outer part, the outer eyelets being protected by an overhanging flap. W. I. Wolfe, 128 Islington, Liverpool.
142,023. Pneumatic wheel tire having crown portion circumferentially elastic. J. G. A. Kitchen, 7 Rose Bank, Scotforth, Lancaster.
142,029. Waterproof covers for saddles of cycles fitted with elastic bands. E. S. Lee, North street, Gosport, Hampshire.
142,044. Shock absorbing wheel tires with sponge rubber filler. F. L. Rapson, Childwall Hall, Liverpool. (See THE INDIA RUBBER WORLD, December 1, 1919, page 156.)
142,079. Pneumatic tire pressure gage. I. Pulverman, 222 Pennsylvania avenue. W. Warren, Penn., U. S. A. (Not yet accepted.)

ISSUED JUNE 30, 1920.

142,151. Petrol tank of celluloid covered with cork reinforced by canvas and vulcanized rubber, with or without sponge rubber. G. F. Linderwood, Croydon Road, Beckenham, Kent, and F. W. Osborne, Fredensborg, Tennyson, Mill Hill, London.
142,234. Horseshoe fitted with blocks of vulcanized rubber, etc. W. Bonson, Halefield, Hale, Altrincham, Cheshire.
142,238. Coffin with rubber packing between flanges of body and lid. F. Foy, Whin-Knowle, Kersal, Salford, Lancashire, and T. Downs, Stepping Hill, Hazel Grove, Cheshire.
142,307. Ventriloquial figure with lips and adjacent features formed of rubber to produce more life-like expression. F. O. Ellis, 40 Summercourt Road, Southend-on-Sea.
142,356. Sleeve for keeping ballonet inflated, leading to opening at nose of aerostat where external pressure is greatest. J. D. Mackworth, 17 Devonshire street, Portland Place, and E. G. Walker, 78 Cheyne court, Chelsea—both in London.
142,372. Auxiliary tire preventing damage to pneumatic tire after deflation. E. C. R. Marks, 57 Lincoln's Inn, Fields, London.
142,373. Apparatus for printing or marking fabrics laid over a curved table fitted with rubber impression pad. E. Sambrook and W. Howarth, Brooklands, and H. Smith Grasmere—both in Harrogate Road, and H. Naylor and H. Jennings, Green Lane Dyeworks—all in Yeadon, Yorkshire.

THE FRENCH REPUBLIC.

PATENTS ISSUED, WITH DATES OF APPLICATION.

503,175. (May 1, 1917.) Elastic tire. Triple Airless Tire Co.
503,390. (September 1, 1919.) Improvements in construction of pneumatic tires. C. L. Marshall.
503,437. (September 3, 1919.) Perfected elastic tire and method of constructing it. A. J. Ostberg and A. Kenny.
503,631. (September 9, 1919.) Improvement in tires. S. Kawanishi.
503,778. (February 3, 1919.) Pliable tube made of waterproof or rubberized fabric. P. E. L. Monge.
503,870. (September 13, 1919.) Elastic tire. J. G. Krichel.
503,890. (September 16, 1919.) Curved fabric for making pneumatic tires and method of manufacture. E. Nelli.

GERMANY.

PATENTS ISSUED, WITH DATES OF APPLICATION.

324,879. (January 21, 1915.) Removable rubber nipple for nursing bottle. Carl Cale, Berlin.
324,880. (August 31, 1915.) Removable nipple. Carl Cale. Berlin.
324,881. (January 14, 1916.) Removable nipple with ventilating device at point where the nipple is inserted. Carl Cale, Berlin.

TRADE MARKS.

THE UNITED STATES.

NO. 106,555. The words BALKELITE-DILECTO—electrical insulating material. The Continental Fibre Co., Newark, Del.
109,785. The word WALKERS above a white triangle surrounding a black triangle bearing the initials H. W.—boots and shoes of cloth, leather or rubber. H. Walker & Son (Leeds), Limited, Leeds, England.
114,072. Representation of an eagle standing with one of its talons resting on a heraldic wreath or crest bar and holding in its other talon a catapult, the elastic of which it is pulling with its beak. W. J. Adams & Co., Limited, Manchester, England.
117,558. The word OSBORN in outline letters within geometric figure.—Foundry supplies, molding machines and parts thereof, cores, stripping machines and vibrators. The Cleveland Osborn Manufacturing Co., Cleveland, Ohio.
119,121. The word DURHAM'S above representation of a bull on which is superimposed the representation of a blow-out patch bearing the words DUR-A-BUL BLOW-OUT PATCH FOR TIRES. C. L. Durham, Salina, Kans.
120,491. The word MONDAE—chewing gum, etc. W. Lohr, New York City, assignor to Candy-Cake, Inc., Wilmington, Del.
120,730. The word WORLD—pneumatic tires. World Tire Corporation, Chicago, Ill.
120,993. The word HONESTY—men's, women's and children's shoes of leather, rubber, fabric and combination materials. International Shoe Co., St. Louis, Mo.
121,616. The word "CHAMPION"—veterinary syringes, pill-injectors, milking tubes, teat-dilating tubes, etc. Becton, Dickinson & Co., Rutherford, N. J.
121,623. The words BEAR HUG above representation of a bear—puncture curing patches. W. F. Goddard, Moberly, Mo.
123,144. Representation of label bearing the words PARAMOUNT, NO METAL TOUCHES THE SKIN, and the figure of a man adjusting a garter, superimposed above a representation of the Paramount garter—garters, hose-supporters, armbands and suspenders. U. S. Garter & Suspender Co., Chicago, Ill.
123,152. Representation of a label bearing design of a girl's head in motor costume, looking through a tire, above the word FITWELL—tire covers. The Bailey Co., Inc., Los Angeles, Calif.
123,438. The word TRIMORE—pneumatic tires. The Lion Supply Co., La Fayette, Ind.
123,548. The words PENTO FOUNTAIN PEN and the representation of a fountain pen against a diagonally blue checkered background, all within a rectangle—fountain pens. W. J. May & Co., Limited, East Twickenham, England.
123,844. The word ELASTICAPS—splice insulators for electric conductors. The Elasticap Co., Hoboken, N. J. (See THE INDIA RUBBER WORLD, March 1, 1920, page 366.)
124,087. The word DELMARVIA—rubber, leather, canvas and balata belting, rubber and metallic hose, steam and hydraulic packing, and pneumatic tires. Delaware Electric & Supply Co., Wilmington, Del.
124,190. The words HORSE SHOE RE-CORD TUBE—inner tubes for pneumatic tires. Racine Auto Tire Co., Racine, Wis. (See THE INDIA RUBBER WORLD, July 1, 1920, page 661.)
125,145. The word ACORN above representation of an acorn—pneumatic tires and tubes. Acorn Tire & Rubber Co., Chicago, Ill.
127,245. The word CLAUSS—rubber snips. The Henkel-Clauss Co., Freemont, Ohio.
127,517. The word PADDY—yielding heels and heel cushions for boots and shoes. Melville Shoe Corp., New York City.
127,622. The words TINY TOT above the representation of a baby lying in a powder puff against a black circular disk surrounded by a narrow white circle—rubber sheeting. United Drug Co., Boston, Mass.
127,699. The word REINDEER—tire casings and tubes. Achilles Rubber & Tire Co., Inc., Binghamton, N. Y.
127,848. The letter A within outline of a spade spot—druggists' sundries, acid bottles, hard rubber gum for dental use, etc. American Rubber Co., Hempstead, N. Y.
127,849. The letter A within outline of a spade spot—hard rubber bowling and roque balls. American Hard Rubber Co., Hempstead and New York City—both in New York.
128,075. A double oval containing a four-sided figure with concave sides and ends, bearing the words BROWN MAKE, the figure 5, and two stars, beside the words BONE DRY—men's shoes made of a combination of leather, canvas and rubber material. Brown Shoe Co., Inc., St. Louis, Mo.
128,205. The word TREDO in white letters on a black diamond—a preparation for filling cavities and healing cuts in rubber tires, shoes and other rubber goods. J. T. Flaherty, Springfield, Mass.
128,341. The words LISLE LASTIC superimposed against a blue background of conventional form—elastic and non-elastic braids. The Braided Fabric Co., Providence, R. I.
128,479. The word CAMCO—canvas and rubber shoes, rubber soles and heels, rubber toe-boxes and rubber counters. W. MacPherson, Cambridge, Mass.
128,499. The word TEXSTAN—machinery packing made wholly or partly of rubber or having rubber incorporated therein. The B. F. Goodrich Co., New York City.
128,497. The word FRESHET—hose made wholly or partly of rubber. The B. F. Goodrich Co., New York City.
128,790. The word DUTIFLEX—fabric covered rubber hose with metal lining. Metal Hose & Tubing Co., Inc., Brooklyn, N. Y.
129,064. The letter B within an ornamental oval—rubber boots, rubbers, etc. Jacobson Bros., New York City.
129,107. The word MOTOMAT—rubber mats. United States Rubber Co., New Brunswick, N. J., and New York City. (See THE INDIA RUBBER WORLD, July 1, 1920, page 663.)
129,292. The letter S—rubber heels. The Squeegee Heel Co., Cleveland, Ohio.
129,293. The word SQUEEGEE—rubber heels. The Squeegee Heel Co., Cleveland, Ohio.

129,305. The word CARMOJON—rubber tires and tubes for vehicles. Carlisle Tire & Rubber Co., Dover, Del., and Carlisle, Penn.

129,489. The word INANDOUT—dress shields. Brooklyn Shield & Rubber Co., Brooklyn, N. Y.

129,575. The word CELOGLAS—Safety goggles with elastic straps. The Standard Optical Co., Geneva, N. Y. (See THE INDIA RUBBER WORLD, June 1, 1920, page 519.)

129,580. Representation of a seal bearing around the edge the words R. T. VANDERBILT CO., N. Y. AMERICAN PRODUCTS, and in the center the words DIXIE CLAY—clay used as filler in the manufacture of paper, paints and rubber products. R. T. Vanderbilt Co., Inc., New York City.

129,737. The word ACORN—tire vulcanizing apparatus. A. E. Nolan, Portland, Oregon.

129,920. The word COMETS—candy-coated chewing gum. Wm. Wrigley, Jr., Co., Chicago, Ill.

130,134. The words NATTY PAD—garters. G. Frost Co., Boston, Mass.

130,324. The word ERCO—cycle handle-bar grips. Essex Rubber Co., Trenton, N. J.

130,565. A black arrow behind a disk bearing a classical figure of an archer, above the words ROYAL ARCHER—rubber sheeting and rubber blankets. Archer Rubber Co., Milford, Mass.

130,566. A black arrow behind a disk bearing a classical figure of an archer, above the word TROJAN—rubber sheeting and rubber blankets. Archer Rubber Co., Milford, Mass.

130,881. Representation of label bearing the words TEABERRY—"IT'S ON THE LEVEL"—chewing gum. The D. L. Clark Co., Pittsburgh, Pa.

131,236. Facsimile of top of stopper bearing the words SAMPSON'S STOPPERS, having the initial and final S the same for both words, and two arrows, accompanied by the words EXPAND and CONTRACT, indicating direction in which to turn stopper—expanding and contracting rubber stoppers for bottles. The Sampson Appliance Corp., New York City. (See THE INDIA RUBBER WORLD, May 1, 1920, page 504.)

132,560. The word ADMIRAL—suspenders. The Russel Manufacturing Co., Middletown, Conn.

132,680. The word ARROW above representation of an arrow—garters and hose supporters. American Textile Products Co., Rochester, N. Y.

132,877. The word HOLLY—elastic webbing, garters, etc. McKenna & Robbins, New York City.

THE UNITED KINGDOM.

394,951. Representation of seal having a figure of a globe in the center, surrounded by 20 stars, and the words THE MANHATTAN RUBBER MFG. CO., PASSAIC, N. J., within the border consisting of concentric circles—rubber machine belting. The Manhattan Rubber Mfg. Co., 61 Willett street, Passaic, N. J., U. S. A.

398,825. Representation of an elephant running, accompanied by the words THORNHILL'S NON-SLIP SOLES—rubber soles and heels. B. A. Thornhill, Single Tree, Newera Eliya, Ceylon; and The Manor House, Pontesbury, Shropshire.

398,853. Representation of a rubber leaf, accompanied by the words RUBBER LEAF BRAND—footwear of leather, canvas, and rubber included in Class 38. The Kaufman Rubber Co., Limited, 410 King Street, West, Kitchener, Waterloo, Ontario, Canada.

400,853. The word MAGNUM—repair outfits for tires. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany Street, Regent's Park, London, N. W. 1.

401,036. The word VARICHOSETTE—surgical stockings, bands, etc. The Vena Appliances Co., 14 Florence Road, Bromley, Kent.

401,077. The words "JOHN BULL"—fountain and stylographic pens. John Bull, Limited, 93 Long Acre, London, W. C. 2.

401,078. The words THE "JOHN BULL" STYLE—stylographic pens included in Class No. 39. John Bull, Ltd., 93 Long Acre, London, W. C. 2.

401,079. The words THE "JOHN BULL" PEN—fountain pens included in Class No. 39. John Bull, Limited, 93 Long Acre, London, W. C. 2.

401,621. The word NONSOL—insulating tape, principally composed of rubber. Connolly Brothers Adhesive Tapes and Insulating Materials Co., 69 St. Stephen's Street, Salford, Manchester, Lancaster.

401,900. The word MELDIA within an ornamental geometric figure—sheet jointing, packing, tubular hose, printing roller composition, stoppers for bottles, billiard table cushions, balloon material. Meldia Mfg. Co., Limited, 10 Throgmorton avenue, London, E. C. 2.

401,973. Representation of a seal bearing the monogram M. D. on a black disk within a circle and beneath, the words "DE-FI-RANE" GUARANTEED WATERPROOF—articles of waterproof, rainproof and shower-proof clothing. Martin Dilks & Co., 5, 16 and 18 Cank street, Leicester.

402,210. The word TANK—rubber erasers. H. A. Coombs, 10 Farringdon avenue, London, E. C. 4.

402,328 The word BOWDEN—rubber pads for boots and shoes. The Heel Guard Co., 44 Huron Road, Balham, London, S. W. 17.

402,853. Representation of a label bearing at left hand end the monogram C. P. M. C. above the words SECURUS JUDICAT ORBIS TERRARUM; at the right hand end the words GUARANTEED PREMIER QUALITY, 14 CARAT GOLD NIB, and facsimile signature of John Whytwarth; in the center the words JOHN WHYTWARTH SCIENTIFIC UNLEAKABLE, ENTIRELY MADE IN GREAT BRITAIN; and, beneath the address of the manufacturer—fountain and stylographic pens. J. Whytwarth, Limited, 14 Ivy Lane, Paternoster Row, London, E. C. 4.

B403,051. The representation of a flying eagle carrying arrows in its talons—fountain and stylographic pens and erasers. The Eagle Pencil Co., 703 East 13th street, N. Y. C., U. S. A.

B403,819. The word FEATHEREDGE—rubber sponges. Markt & Co., (London), Limited, 98 and 100, Clerkenwell Road, London, E. C. 1.

NEW ZEALAND.

TO AMERICANS.

16,031. Representation of seal having a figure of a globe in the center, surrounded by 20 stars and the words THE MANHATTAN RUBBER MFG. CO., PASSAIC, N. J., within the border consisting of concentric circles—belting, rubber tubes, carriage-aprons, bands, bags, bladders, buffers, rubber cloth, air-cushions, insulators, funnels, rubber door-mats, and all other goods made of rubber or gutta percha included in Class No. 40, except rubber pouches. The Manhattan Rubber Mfg. Co., 61 Willett street, Passaic, N. J., U. S. A.

16,242. Outline of a boomerang above the word BOOMERANG—goods manufactured from india rubber and gutta percha not included in classes other than No. 40. Barnett Glass Rubber Co., Limited, 289-293 Swanston street, Melbourne, Victoria, Australia.

16,322. The words BOSTON GARTER—garters, George Frost Co., 1551 Tremont street. Boston, Mass., U. S. A.

16,488. Representation of a tire—pneumatic and solid tires, inner tubes, tire accessories, mechanical rubber goods, druggists' sundries and all other goods manufactured from india rubber and gutta percha not included in classes other than No. 40. The F. E. Partridge Rubber Co., Limited, Guelph, Ontario, Canada.

16,489. The word "GUIDE" quoted—rubber footwear. The F. E. Partridge Rubber Co., Limited, Guelph, Ont., Canada.

16,490. The word "GUIDE" quoted—pneumatic and solid tires, tubes, accessories, mechanical rubber goods, druggists' sundries, and all goods manufactured from rubber and gutta percha not included in classes other than Class No. 40. The F. E. Partridge Rubber Co., Limited, Guelph, Ont., Canada.

16,542. The word PHILCO—rubber battery-plate separators or retainers. Philadelphia Storage Battery Co., Ontario and C streets, Philadelphia, Pa., U. S. A. (See description elsewhere in this issue.)

16,564. The word ALPCO—erasers, rubber bands, etc. American Lead Pencil Co., 173-175 Lower Clapton Road, London, E., England, and 220 Fifth avenue, New York City, U. S. A.

16,565. The word AURORA—erasers, rubber bands, etc. American Lead Pencil Co., 173-175 Lower Clapton Road, London, E., England; and 220 Fifth avenue, New York City, U. S. A.

16,566. The word VINDICTIVE—erasers, rubber bands, etc. American Lead Pencil Co., 173-175 Lower Clapton Road, London, E., England; and 220 Fifth avenue, N. Y. C., U. S. A.

16,617. Representation of a tire with a partridge standing within the lower part—rubber footwear. The F. E. Partridge Rubber Co., Limited, Guelph, Ontario, Canada.

DESIGNS.

THE UNITED STATES.

NO. 55,411. Tire tread. Patented June 8, 1920. Term 14 years. A. L. Breitenstein, Akron, O., assignor to World Tire Corporation, Chicago, Ill.

55,414. Tire. Patented June 8, 1920. Term 3½ years. D. F. Crow, Omaha, Nebr.

55,416. Tire. Patented June 8, 1920. Term 14 years. J. W. Demead, Akron, Ohio.

55,419. Rubber shoe plate. Patented June 8, 1920. Term 7 years. D. H. Eley and T. H. Ryan, assignors to The Emory Rubber Sole Co., Inc.—all of Norfolk, Va.

55,420. Tire. Patented June 8, 1920. Term 14 years. H. T. Gauss, Chicago, Ill.

55,514 55,420 55,425 55,411 55,416 **55,437** 55,459 55,506 55,507

55,425. Tire tread. Patented June 8, 1920. Term 7 years. W. Kline, Mogadore, O.

55,437. Tire. Patented June 8, 1920. Term 14 years. F. E. Shannon, Akron, O.

55,459. Tire. Patented June 15, 1920. Term 7 years. J. B. Gabeline, Burlington, assignor to Standard Four Tire Co., Keokuk—both in Iowa.

55,471. Advertising sign comprising a billboard within a colossal tire. Patented June 15, 1920. Term 7 years. R. R. Johnstone, Wauwatosa, Wis.

55,475. Tire cover. Patented June 15, 1920. Term 7 years. P. M. Lockwood, Kansas City, Mo.

55,506. Non-skid tire tread. Patented June 22, 1920. Term 14 years. E. N. Downes, assignor to J. & D. Tire Co.—both of Charlotte, N. C.

55,507. Non-skid tire. Patented June 22, 1920. Term 14 years. W. E. Duersten, New Castle, Pa.

55,528. Sole of a rubber boot or shoe. Patented June 22, 1920. Term 14 years. W. E. Piper, Melrose, assignor to Boston Rubber Shoe Co., Boston—both in Mass.

55,529. Sole of a rubber overshoe or similar article. Patented June 22, 1920. Term 14 years. W. E. Piper, Melrose, assignor to Boston Rubber Shoe Co., Boston—both in Mass.

55,552. Tire rack. Patented June 29, 1920. Term 7 years. J. F. Brennan, Williamsport, Pa.

Review of the Crude Rubber Market.

NEW YORK.

WHEN first latex crêpe was quoted on the spot at 30 cents during the last week of July, the low record was established for this standard grade. The absence of sellers and the lack of buying interest on the part of manufacturers were influencial factors in the support of the market.

Conditions in the plantation rubber market during the past month have been generally quiet and prices steady although the tendency has been downward. There was a marked scarcity of sellers, and other than dealers' business, little buying has been done as the manufacturers evidently believe that the bottom has not been reached. In fact, several large buyers became September sellers as futures were out of all proportion to spot quotations.

Parás have kept company with plantations being ruled by the same market conditions, but prices are believed to have reached rock bottom.

Spot and future prices for plantation and South American rubber at the beginning and toward the end of the month are shown in the following quotations:

PLANTATIONS. July 1, first latex crêpe, spot, 35 cents; July-September, 37 cents; October-December, 40¾ cents; January-June, 43½ cents.

July 26, first latex crêpe, spot, 32 cents; July-September, 33½ cents; October-December, 37 cents; January-June 42½ cents.

July 1, ribbed smoked sheets, spot, 35 cents; July-September, 36½ cents; October-December, 40¾ cents; January-June, 43½ cents.

July 26, ribbed smoked sheets, spot, 31½ cents; July-September, 33¼ cents; October-December, 36¾ cents; January-June, 42 cents.

July 1, No. 1 amber crêpe, spot, 38 cents.

July 26, No. 1 amber crêpe, spot, 30 cents.

July 1, No. 1 rolled brown crêpe, spot, 29 to 30 cents.

July 26, No. 1 rolled brown crêpe, spot, 27½ cents.

SOUTH AMERICAN PARÁS AND CAUCHO. July 1, upriver fine, spot, 35 to 36 cents; islands fine, 37 cents; upriver coarse, 26 cents; islands coarse, 21 cents; Cametá coarse, 20¼; caucho ball 27 cents.

July 26, upriver fine, spot, 34½ cents; islands fine, 33 cents; upriver coarse, 23 cents; islands coarse, 20 cents; Cametá coarse, 19 cents; caucho ball, 21 to 24 cents.

NEW YORK QUOTATIONS.

Following are the New York spot quotations, for one year ago, one month ago, and July 26, the current date:

	August 1, 1919.	July 1, 1920.	July 26, 1920.
PLANTATION HEVEA—			
First latex crêpe	$0.41 @.41½	$0.35 @.36	$0.32 @
Amber crêpe No. 1	.38 @	.38 @	.30 @
Amber crêpe No. 2	.37 @	.35 @.36	.29 @
Amber crêpe No. 3	.36 @	.34 @.35	.28½ @
Amber crêpe No. 4	.35 @	.33 @.34	.27½ @
Brown crêpe, thick and thin clean	.35 @	.33 @.35	.29 @
Brown crêpe, thin specky	.32 @	.31 @	.28 @
Brown crêpe, rolled	.29 @.29½	.30 @	.26½ @.27½
Smoked sheet, ribbed, standard quality	.40 @	.35 @	.31½ @
Smoked sheet, plain, standard quality	.39 @	.36 @	.30 @
Unsmoked sheet, standard quality	.38 @	.33 @	.25 @
Colombo scrap No. 1	.32 @	.30 @	.23 @
Colombo scrap No. 2	.30 @	.28 @	.21½ @
EAST INDIAN—			
Assam crêpe	*.58 @	@	@
Assam onions	@	@	@
Penang block scrap	*.40 @	@	@
PONTIANAK—			
Banjermassin	.13¼ @	.12½ @	.12 @
Palembang	.14½ @	@	.13 @
Pressed block	.21½ @	.24 @	.23 @
Sarawak	.11 @	@	@
SOUTH AMERICAN—			
PARAS—			
Upriver fine	$0.54¼ @.55	$0.35 @.36	$0.34½ @.35
Upriver medium	*.52 @	.34 @	.30 @
Upriver coarse	.32 @	.26 @	.23 @
Upriver weak, fine	.39 @	.33 @	.30 @
Islands, fine	.48 @	.37 @	.33 @
Islands, medium	*.44 @	.35 @	.30 @
Islands, coarse	*.21 @	.21 @	.20 @
Cametá, coarse	*.22 @	.20 @.20½	.19 @
Madeira, fine	.55½ @	.40 @	.37 @
Acre Bolivian, fine	.55 @	.39 @	.36 @
Peruvian fine	.53 @	*.36½ @	.32 @
Tapajos fine	.53½ @	*.36 @	.30 @
CAUCHO—			
Lower caucho ball	.29 @	.27 @.28	.21 @
Upper caucho ball	.48 @	.29 @	.24 @
MANICOBAS—			
Ceará negro heads	*.34 @	.25 @	@
Ceará scrap	*.29 @	.18 @	@
Manicoba, 30% guarantee	*.32 @	.24 @	@
Mangabeira thin sheet	*.38 @	.30 @	@
CENTRALS—			
Corinto scrap	.31 @	.22 @	.19 @
Esmeralda sausage	.31 @	.22 @	.19 @
Central scrap	.31 @	.21 @.22	.19 @
Central scrap and strip	.29 @	.19 @.20	.17 @
Central wet sheet	.20 @.21	.15 @	.13 @
Guayule, 20% guarantee	.25 @	.27 @	.28 @
Guayule, washed and dried	.35 @	.37 @	.38 @
AFRICANS—			
Niger flake, prime	@	.16 @	.18¼ @
Benguela, extra No. 1, 28%	.24 @	.21 @	.14 @
Benguela, No. 2, 32½%	.25 @	.19 @	@
Conaky niggers	@	.33 @	@
Congo prime, black upper	.35 @	.19 @	@
Congo prime, red upper	.35 @	@	@
Kassai black	@	@	@
red	@	.35 @	@
Massai sheets and strings	@	.33 @	@
Rio Nunez ball	@	.35 @	@
Rio Nunez sheets and strings	@	.34 @	@
GUTTA PERCHA—			
Gutta Siak	.22 @	.26 @	.24 @.25
Red Macassar	2.60 @	2.75 @	2.80 @
BALATA—			
Block, Ciudad Bolivar	.78 @	.72 @	.72 @
Colombia	.61 @.62	.47 @	.50 @.51
Surinam sheet	.93 @.94	.79 @	.73 @
amber	.94 @.95	.82 @	.82 @

*Nominal.

RECLAIMED RUBBER.

A healthy request for reclaims has been maintained during July, although transportation facilities continue poor and deliveries uncertain. The mechanical goods factories were somewhat less busy than a month ago and there is an appreciable slowing down in tire production, resulting in easier conditions and lower prices for certain grades of reclaimed rubber.

NEW YORK QUOTATIONS.

JULY 26, 1920.

Prices subject to change without notice.

Standard reclaims:		
Floating	$0.27	@$0.32
Friction	.25 @	.30
Mechanical	.12 @	.13
Red	.22 @	.23
Shoe	.15¾ @	.16¼
Tires, auto	.16 @	.17
truck	.12½ @	.13½
White	.22 @	.25

THE MARKET FOR COMMERCIAL PAPER.

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 1 Liberty street, New York City, advises as follows:

"During July the demand for commercial paper has been very limited, and almost entirely from out-of-town banks, rates ruling at 8¼ to 8½ per cent for the best rubber names, and even higher for those not so well known."

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES.

	July. 1920.*	1919.	1918.
PLANTATIONS—			
First latex crêpe	$0.36 @ $0.32	$0.42½ @ $0.39½	$0.63 @ $0.63
Smoked sheet ribbed	.35½ @ .31½	.41½ @ .38½	.62 @ .62
PARAS—			
Upriver, fine	.36½ @ .34½	.55¼ @ .55	.68 @ .68
Upriver, coarse	.32 @ .24	.33 @ .32	.40 @ .40
Islands, fine	.37 @ .33	.47½ @ .47½	.59 @ .59
Islands, coarse	.31 @ .21	.21½ @ .21½	.27 @ .27
Cametá	.20½ @ .19	.21½ @ .21½	.28 @ .28

*Figured to July 27.

SINGAPORE RUBBER MARKET.

GUTHRIE & CO., LIMITED, Singapore, report [June 10, 1920]:

Following advices of declining values in London and New York, the rubber auction opened yesterday to a considerably weaker market and prices of all grades show a substantial drop from last week. The highest paid for fine pale crêpe was 76½ cents (two special parcels sold at 77 cents), a decline of 5½/6 cents, while ribbed smoked sheet fetched up to 77 cents (paid for a few lots only), being 4½/5 cents down. Off quality sheet and crêpe was difficult of sale and sellers had to make considerable sacrifices on these grades to meet the market. Brown and dark crêpes were 6/8 cents down.

Demand was fairly good at the lower levels, but prices tended to sag during the course of the sale and the market closed distinctly weak with the prospect of a further decline.

Of 771 tons cataloged, 456 tons were sold.

The following is the course of values:

	In Singapore per Pound.[1]	Sterling Equivalent per Pound in London.
Sheet, fine ribbed smoked	76c @ 77c	1/11¾ @ 2/ 0
Sheet, good ribbed smoked	63 @ 75	1/ 8 @ 1/11½
Crêpe, fine pale	76 @ 76½	2/ 0½ @ 2/ 0⅝
Crêpe, good pale	65 @ 75½	1/ 9⅛ @ 2/ 0⅛
Crêpe, fine brown	58 @ 66	1/ 7⅛ @ 1/ 9⅛
Crêpe, good brown	48½ @ 57	1/ 4½ @ 1/ 6⅞
Crêpe, dark	41½ @ 54	1/ 2½ @ 1/ 6
Crêpe, bark	40 @ 45½	1/ 2 @ 1/ 3⅜

[1]Quoted in Straits Settlements currency; $1 = $0.567 United States currency.

AMSTERDAM RUBBER MARKET.

JOOSTEN & JANSSEN, Amsterdam, report [July 9, 1920]:

During the last week the market was firm, although interest was chiefly concentrated in First Qualities Hevea, whilst the lower grades found few or no buyers. Prices paid for Standard Qualities consequently improved from f. 1.16 to f. 1.30.

On the Terminal Market a large turn-over took place; July delivery improved from f. 1.14½ to f. 1.20, December from f. 1.24—f. 1.26, March from f. 1.27½ to f. 1.32½. The market closed easier, particularly for the further positions: July f. 1.20, October f. 1.22, December f. 1.25, March f. 1.29.

FEDERATED MALAY STATES RUBBER EXPORTS.

An official report from Kuala Lumpur states that the exports of plantation rubber from the Federated Malay States for the month of May amounted to 7,627 tons, compared with 8,375 tons in April and 7,308 tons in the corresponding month last year. The total exports for five months in the current year were 46,426 tons, against 43,623 tons for the corresponding period last year and 35,396 tons in 1918. Appended are the comparative statistics:

	1918.	1919.	1920.
January ..... *tons*	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
Totals	35,396	43,623	46,426

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official report from Singapore states that the exports of plantation rubber from Straits Settlements ports in the month of May amounted to 15,617 tons (of which 2,788 tons were transshipments), against 15,720 tons in April and 15,845 tons in the corresponding month last year. The total shipments for the five months of the present year amount to 67,772 tons, compared with 77,666 tons last year and 35,665 tons in 1918. Appended are the comparative statistics:

	1918.	1919.	1920.
January ..... *tons*	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	15,720
May	13,587	15,845	15,617
Totals	35,665	77,666	67,772

RUBBER EXPORTS FROM PENANG.

	January 1 to May 31. 1919.	1920.
To Great Britain ..... *piculs*[1]	93,377	95,194
Europe	.....	945
United States	50,413	91,577
Totals	143,790	187,716

[1]One picul equals 133⅓ pounds.

PLANTATION RUBBER EXPORTS FROM JAVA.

	April. 1919.	1920.	Four Months Ended April 30. 1919.	1920.
To Netherlands ..... *kilos*	.....	471,000	120,000	1,532,000
Great Britain	1,882,000	1,157,000	2,901,000	2,324,000
Germany	.....	18,000	.....	18,000
France	.....	.....	176,000	.....
United States	1,586,000	1,005,000	6,621,000	5,679,000
Singapore	600,000	538,000	1,991,000	1,708,000
Japan	53,000	47,000	178,000	178,000
Australia	.....	16,000	.....	16,000
Other countries	36,000	.....	175,000	.....
Totals	4,157,000	3,252,000	12,162,000	11,455,000
Ports of origin:				
Tandjong Priok	1,887,000	1,339,000	5,921,000	5,391,000
Samarang	47,000	36,000	203,000	186,000
Soerabaya	2,001,000	1,737,000	5,463,000	5,472,000

CEYLON RUBBER IMPORTS AND EXPORTS.

IMPORTS.

	January 1 to May 31. 1919.	1920.
Crude rubber:		
From Straits Settlements ..... *pounds*	1,087,026	1,242,457
India	612,757	717,661
Burma and other countries	.....	6,300
Totals	1,699,783	1,966,418

EXPORTS.

Crude rubber:		
To United Kingdom	15,227,401	13,015,130
Belgium	29,120	106,830
France	330,010	223,107
Germany	.....	108,228
Netherlands	.....	28
Italy	.....	89,600
Australia	.....	56
Victoria	89,785	5,440
United States	33,634,370	17,057,312
New South Wales	91,700	158,294
Canada and Newfoundland	260,016	425,600
India	1,977	586
Straits Settlements	424	44,800
Japan	121,741	155,427
Totals	49,786,544	31,390,438

(Compiled by the Ceylon Chamber of Commerce.)

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS.

PARAS AND CAUCHO AT NEW YORK.

	Fine.	Medium.	Coarse.	Caucho.	Totals. Pounds.
JUNE 28. By the S. S. *Gregory*, from Pará.					
Thornett & Fehr, Inc.	.....	.....	.....	.....	15,092
Neuss, Hesslein & Co.	.....	.....	.....	.....	15,582
Poel & Kelly	8,663	.....	91,207	55,801	155,671
H. A. Astlett & Co.	33,000	.....	109,000	89,600	231,600
JUNE 28. By the S. S. *Gregory*, from Iquitos.					
Meyer & Brown, Inc.	.....	.....	.....	.....	1,568
Various	.....	.....	.....	.....	84,084
JUNE 28. By the S. S. *Gregory*, from Manáos.					
Meyer & Brown, Inc.	.....	.....	33,600	56,000	89,600
JUNE 30. By the S. S. *West Galeta*, from Montevideo.					
Various	.....	.....	.....	.....	8,030
JUNE 30. By the S. S. *Frankmere*, from Pará.					
Thornett & Fehr, Inc.	.....	.....	.....	.....	11,368
Wm. Schall & Co.	30,571	.....	13,272	15,373	59,216
Poel & Kelly	.....	.....	9,022	7,775	16,797
H. A. Astlett & Co.	.....	.....	.....	.....	4,116
JULY 7. By the S. S. *Michael*, from Iquitos.					
Meyer & Brown, Inc.	.....	.....	.....	.....	980
Various	.....	.....	.....	.....	41,258
JULY 7. By the S. S. *Michael*, from Manáos.					
Pell & Dumont, Inc.	.....	.....	.....	.....	3,430
H. A. Astlett & Co.	132,700	.....	21,600	44,800	199,100
Poel & Kelly	36,327	.....	12,861	213,585	262,773
G. Amsinck & Co., Inc.	.....	.....	.....	.....	7,742
W. R. Grace & Co.	.....	.....	.....	.....	31,360
Meyer & Brown, Inc.	22,400	.....	33,600	152,320	208,320
JULY 13. By the S. S. *Rembrandt*, from Rio de Janeiro.					
Wm. Schall & Co.	14,608	.....	.....	25,390	39,998
Poel & Kelly	.....	.....	26,828	645	33,473
H. A. Astlett	4,300	.....	3,100	.....	7,400

PLANTATIONS.

(Figured 180 pounds to the bale or case.)

	Shipment from:	Shipped to:	Pounds.	Totals.
JUNE 16. By the S. S. *West Cadron* at San Francisco via Manila.				
Firestone Tire & Rubber Co.	Singapore	Akron	586,800	586,800
JUNE 20. By the S. S. *Batoe*, at San Francisco.				
Firestone Tire & Rubber Co.	Macassar	Akron	72,900	
Firestone Tire & Rubber Co.	Soerabaya	Akron	28,980	
Various	Soerabaya	San Francisco	54,000	
Various	Macassar	Akron	18,720	174,600
JUNE 21. By the S. S. *Noordam*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	33,600	33,600
JUNE 23. By the S. S. *Tenyo Maru*, at San Francisco.				
Firestone Tire & Rubber Co.	Singapore	Akron	403,200	
Various	Singapore	San Francisco	47,700	450,900
JUNE 25. By the S. S. *St. Paul*, at New York.				
F. B. Vandegrift & Co.	London	New York	720	
The Goodyear Tire & Rubber Co.	London	Akron	383,220	383,940
JUNE 28. By the S. S. *Hakodate Maru*, at New York.				
Hood Rubber Co.	Colombo	Watertown	110,160	
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Various	Colombo	New York	402,040	624,200
JUNE 28. By the S. S. *Jason*, at New York.				
F. R. Henderson & Co.	Penang	New York	121,500	
L. Littlejohn & Co., Inc.	Penang	New York	60,300	
Rubber Trading Co.	Penang	New York	39,600	
Thornett & Fehr, Inc.	Penang	New York	40,500	
Edward Boustead & Co.	Penang	New York	94,140	
Joosten & Janssen	Penang	New York	100,800	
Various	Penang	New York	143,820	
Aldens' Successors, Inc.	Singapore	New York	14,580	
Baird Rubber & Trading Co.	Singapore	New York	112,000	
Thos. A. Desmond & Co.	Singapore	New York	50,400	
Vernon Metal & Produce Co.	Singapore	New York	187,200	
Rubber Trading Co.	Singapore	New York	96,480	
W. G. Ryckman, Inc.	Singapore	New York	14,400	
United States Rubber Plantations, Inc.	Singapore	Akron	648,000	
F. R. Henderson & Co.	Singapore	New York	17,640	
Meyer & Brown, Inc.	Singapore	New York	56,000	
General Rubber Co.	Singapore	New York	659,700	
J. Aron & Co.	Singapore	New York	29,160	
Balfour, Williamson & Co.	Singapore	New York	48,960	
Poel & Kelly	Singapore	New York	13,500	
Edward Maurer, Inc.	Singapore	New York	56,880	
L. Littlejohn & Co., Inc.	Singapore	New York	560,000	
Thornett & Fehr, Inc.	Singapore	New York	184,140	
Fred Stern & Co.	Singapore	New York	470,400	
Thornett & Fehr, Inc.	P't Sw't'nh'm	New York	33,840	
The B. F. Goodrich Co.	P't Sw't'nh'm	Akron	757,080	
Whitall Tatum Co.	P't Sw't'nh'm	New York	27,360	
Various	P't Sw't'nh'm	New York	117,000	
L. Littlejohn & Co., Inc.	Deli	New York	118,620	
East Asiatic Co., Inc.	Deli	New York	4,500	
E. S. Kuh & Valk Co.	Deli	New York	135,000	
Fred Stern & Co.	Deli	New York	98,640	
The Fisk Rubber Co.	Deli	Chicopee Falls	25,200	
W. R. Grace & Co.	Deli	New York	97,560	
Thornett & Fehr, Inc.	Deli	New York	18,000	
Aldens' Successors, Inc.	Deli	New York	126,000	
Poel & Kelly	Deli	New York	14,400	
Firestone Tire & Rubber Co.	Deli	Akron	253,800	
Various	Deli	New York	328,500	5,975,600
JUNE 29. By the S. S. *Eastern Exporter*, at Seattle.				
Mitsui & Co., Limited	Yokohama	Seattle	54,000	
*C. Solomon, Jr.	Yokohama	San Francisco	149,940	203,940
JUNE 29. By the S. S. *Protesilaus*, at Seattle.				
Firestone Tire & Rubber Co.	Hongkong	Akron	250,560	250,560
JUNE 29. By the S. S. *Santa Cruz*, at San Francisco.				
Firestone Tire & Rubber Co.	Penang	Akron	196,020	
¶Firestone Tire & Rubber Co.	Singapore	Akron	320,940	516,960
JUNE 30. By the S. S. *Navarino*, at New York.				
T. D. Downing & Co.	London	New York	247,140	
General Rubber Co.	London	New York	721,800	
Poel & Kelly	London	New York	245,880	
Baring Bros.	London	New York	466,540	
Various	London	New York	144,720	1,826,080

* 44 bales short.

¶ 1,083 packages short.

	Shipment from:	Shipped to:	Pounds.	Totals.
JUNE 30. By the S. S. *Harold Dollar*, at New York.				
Suzuki & Co.	Singapore	New York	99,900	
Chas. T. Wilson Co., Inc.	Singapore	New York	568,260	
Weise & Co.	Singapore	New York	43,200	
Thornett & Fehr, Inc.	Singapore	New York	29,700	
The B. F. Goodrich Co.	Singapore	Akron	733,680	
Rubber Importers' & Dealers' Co.	Singapore	New York	283,680	
The Fisk Rubber Co.	Singapore	Chicopee Falls	308,160	
Meyer & Brown, Inc.	Singapore	New York	26,460	
L. Littlejohn & Co., Inc.	Singapore	New York	23,418	
Various	Singapore	New York	561,282	2,677,740
JUNE 30. By the S. S. *Genoa Maru*, at New York.				
Mitsui & Co., Limited	Singapore	New York	100,800	
L. Littlejohn & Co., Inc.	Singapore	New York	112,300	
Various	Singapore	New York	172,820	385,920
JUNE 30. By the S. S. *Siberia Maru*, at San Francisco.				
Gates Rubber Co.	Kobe	Denver	69,480	69,480
JUNE 30. By the S. S. *Tjikembang*, at San Francisco.				
†The Goodyear Tire & Rubber Co.	Soerabaya	Akron	113,940	
‡The Goodyear Tire & Rubber Co.	Batavia	Akron	275,220	
Irwin-Harrison & Crosfield, Inc.	Batavia	New York	180	
Savage Tire Corp.	Soerabaya	San Diego	96,120	
§Firestone Tire & Rubber Co.	Batavia	Akron	133,920	619,380
JULY 1. By the S. S. *Samarinda*, at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	261,720	
Fred Stern & Co.	Batavia	New York	174,720	
The B. F. Goodrich Co.	Batavia	Akron	73,980	
Robertson, Cole & Co.	Batavia	New York	36,000	
L. Littlejohn & Co., Inc.	Java	New York	268,800	
Manhattan Rubber Mfg. Co.	Batavia	Passaic	27,000	
G. Amsinck & Co., Inc.	Padang	New York	22,500	
Various	Batavia	New York	215,160	1,079,880
JULY 3. By the S. S. *Nordic*, at New York.				
Baring Bros.	Colombo	New York	50,400	
The Goodyear Tire & Rubber Co.	Colombo	Akron	225,540	
Chas. T. Wilson Co., Inc.	Colombo	New York	27,540	
Meyer & Brown, Inc.	Colombo	New York	56,000	
L. Littlejohn & Co., Inc.	Colombo	New York	67,200	426,680
JULY 3. By the S. S. *Vardulia*, at New York.				
The B. F. Goodrich Co.	Liverpool	Akron	10,260	10,260
JULY 6. By the S. S. *Volumnia*, at New York.				
The B. F. Goodrich Co.	Liverpool	Akron	8,820	8,820
JULY 6. By the S. S. *Urbino*, at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	36,000	
Various	Cochin	New York	114,480	150,480
JULY 6. By the S. S. *Minnekahda*, at New York.				
Various	London	New York	73,620	73,620
JULY 6. By the S. S. *Saugerties*, at New York.				
The B. F. Goodrich Co.	Batavia	Akron	178,380	
Kuharah Trading Co., Limited	Batavia	New York	70,560	
X. W. Obalski & Co., Inc.	Soerabaya	New York	24,480	
Fred Stern & Co.	Soerabaya	New York	112,000	
Kuharah Trading Co.	Soerabaya	New York	148,860	
Fred Stern & Co.	Singapore	New York	20,520	
L. Littlejohn & Co., Inc.	Java	New York	448,000	
Aldens' Successors, Inc.	Singapore	New York	12,600	
The B. F. Goodrich Co.	Singapore	Akron	449,820	1,465,220
JULY 6. By the S. S. *Western Knight*, at New York.				
Fred Stern & Co.	Soerabaya	New York	387,520	
Kuharah Trading Co., Limited	Soerabaya	New York	32,580	
Frank Waterhouse & Co.	Soerabaya	New York	15,120	
L. Littlejohn & Co., Inc.	Soerabaya	New York	200,800	
H. A. Astlett & Co.	Soerabaya	New York	7,740	
Winter, Ross & Co.	Soerabaya	New York	37,260	
F. R. Henderson & Co.	Soerabaya	New York	79,920	
H. A. Astlett & Co.	Singapore	New York	118,500	
Edward Boustead & Co.	Singapore	New York	136,800	
The B. F. Goodrich Co.	Singapore	Akron	246,780	
Meyer & Brown, Inc.	Singapore	New York	235,260	
Various	Java	New York	506,700	2,004,920

‡ 497 cases short shipped.

§ 12 cases short shipped.

PLANTATIONS.

	Shipment from:	Shipped to:	Pounds.	Totals.
JULY 10. By the S. S. *Orteric*, at New York.				
Hood Rubber Co.....	Colombo	Watertown	47,160	
Hadden & Co.....	Colombo	New York	22,320	
Manhattan Rubber Mfg. Co.	Colombo	Passaic	113,400	
Meyer & Brown, Inc....	Colombo	New York	100,800	
L. Littlejohn & Co., Inc.	Colombo	New York	201,600	
Various	Colombo	New York	61,020	546,300
JULY 10. By the S. S. *Anglo Chilean*, at New York.				
Various	London	New York	1,151,640	1,151,640
JULY 13. By the S. S. *Kaiserin A. Victoria*, at New York.				
General Rubber Co.....	Liverpool	New York	3,960	3,960
JULY 14. By the S. S. *Dardanus*, at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	400,680	
H. A. Forbes & Co.....	Batavia	New York	103,760	
F. R. Henderson & Co..	Batavia	New York	18,720	
Fred Stern & Co.....	Batavia	New York	134,400	
Robertson, Cole & Co...	Batavia	New York	61,560	
Manhattan Rubber Mfg. Co.	Batavia	New York	27,000	
Aldens' Successors, Inc..	Batavia	New York	152,640	
L. Sutro & Co.....	Batavia	New York	74,520	
United Malaysian Rubber Co., Limited	Batavia	New York	1,440	
Peninsular Trading Agency, Inc.	Soerabaya	New York	6,480	
Baird Rubber & Trading Co.	Singapore	New York	107,520	
Various	Batavia	New York	472,320	1,561,040
JULY 16. By the S. S. *Nile*, at San Francisco.				
Fred Stern & Co.....	Singapore	New York	168,560	
Various	Singapore	San Francisco	18,000	186,560
JULY 17. By the S. S. *Kinderdijk*, at New York.				
Meyer & Brown, Inc...	Rotterdam	New York	22,400	22,400
JULY 19. By the S. S. *Kongosan Maru*, at Seattle.				
Mitsui & Co., Limited...	Kobe	Seattle	76,500	76,500
JULY 21. By the S. S. *Oscar II*, at New York.				
General Tire & Rubber Co.	Christiana	Akron	2,520	2,520
JULY 22. By the S. S. *Muncaster Castle*, at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	268,800	
Fred Stern & Co.....	Singapore	New York	266,560	535,360
JULY 23. By the S. S. *Lieceric*, at New York.				
Fred Stern & Co.....	Singapore	New York	342,720	342,720
JULY 23. By the S. S. *Eurymachus*, at New York.				
Fred Stern & Co.....	Singapore	New York	170,240	170,240

BALATA.

JUNE 22. By the S. S. *Oranje Nassau*, at New York.				
Middleton & Co., Limited	Surinam	New York	4,222	4,222
JUNE 24. By the S. S. *Santa Marta*, at New York.				
American Trading Co...	Cristobal	New York	3,000	3,000
JUNE 30. By the S. S. *Maraval*, at New York.				
Middleton & Co., Limited	Cayenne	New York	6,710	6,710
JULY 1. By the S. S. *Zacapa*, at New York.				
Rafael del Castillo & Co.	Cartegena	New York	1,050	1,050
JULY 2. By the S. S. *Lakeview*, at New York.				
Antoine Chiris Co.....	St. Laurent du Maroni	New York	5,400	5,400
JULY 7. By the S. S. *Colon*, at New York.				
Hollingshurst & Co.....	Cristobal	New York	4,800	
Various	Cristobal	New York	300	5,100
JULY 15. By the S. S. *Ancon*, at New York.				
J. S. Sembrada & Co., Inc.	Buenaventura	New York	7,570	7,570
JULY 21. By the S. S. *General G. W. Goethals*, at New York.				
Ultramares Corp.	Cristobal	New York	16,575	
A. M. Capens' Sons....	Cristobal	New York	2,550	19,120

CENTRALS.

JUNE 23. By the S. S. *Panuco*, at New York.				
Various	Puerto Mexico	New York	19,205	19,205
JUNE 30. By the S. S. *Maraval*, at New York.				
South & Central American Commission Co...	Trinidad	New York	26,250	26,250
JULY 7. By the S. S. *Colon*, at New York.				
Wellman, Peck & Co....	Cristobal	New York	3,600	
Ultramares Corp.	Cristobal	New York	25,380	
Mecke & Co.....	Cristobal	New York	9,000	
Isaac Brandon & Bros..	Cristobal	New York	900	
Hollinghurst & Co.....	Cristobal	New York	2,340	
Various	Cristobal	New York	2,520	43,740
JULY 15. By the S. S. *Ancon*, at New York.				
De Lima, Correa & Cortissez, Inc.....	Cristobal	New York	900	
G. Amsinck & Co., Inc..	Cristobal	New York	4,350	
J. S. Sembrada & Co...	Cristobal	New York	9,000	
Heilbron, Wolff & Co...	Cristobal	New York	7,050	
Various	Cristobal	New York	1,750	23,050
JULY 21. By the S. S. *Gen. G. W. Goethals*, at New York.				
A. M. Capens' Sons, Inc.	Cristobal	New York	5,100	
Pablo, Calvet & Co.....	Cristobal	New York	19,650	
Chas. E. Griffin.....	Cristobal	New York	3,000	27,750

AFRICANS.

JUNE 28. By the S. S. *Niagara*, at New York.				
Various	Havre	New York	40,480	40,480
JUNE 30. By the S. S. *Roman Prince*, at New York.				
Poel & Kelly.....	Havre	New York	34,991	34,991
JUNE 30. By the S. S. *Nieuw Amsterdam*, at New York.				
Julius Schmid, Inc.....	Rotterdam	New York	7,360	
Various	Rotterdam	New York	93,725	101,085
JULY 6. By the S. S. *Clan MacKellar*, at New York.				
Various	African Ports	New York	6,785	6,785
JULY 7. By the S. S. *Luxpalite*, at New York.				
Poel & Kelly.....	Bordeaux	New York	27,444	27,444
JULY 12. By the S. S. *City of Birmingham*, at New York.				
Various	Beira	New York	4,500	4,500
JULY 13. By the S. S. *Rotterdam*, at New York.				
Various	Rotterdam	New York	131,790	131,790
JULY 15. By the S. S. *Chipana*, at New York.				
Baird Rubber & Trading Co.	Liverpool	New York	2,240	2,240
JULY 19. By the S. S. *Kinderdijk*, at New York.				
Various	Rotterdam	New York	44,850	44,850

PONTIANAK.

JUNE 28. By the S. S. *Jason*, at New York.				
Various	Singapore	New York	153,300	153,300
JUNE 30. By the S. S. *Harold Dollar*, at New York.				
Baring Bros.	Singapore	New York	45,000	
L. Littlejohn & Co., Inc.	Singapore	New York	144,600	
Various	Singapore	New York	165,900	355,500
JULY 1. By the S. S. *Samarinda*, at New York.				
Various	Soerabaya	New York	25,500	25,500
JULY 6. By the S. S. *Saugerties*, at New York.				
H. A. Astlett & Co.....	Batavia	New York	3,000	3,000
JULY 14. By the S. S. *Dardanus*, at New York.				
E. Everett Carlton & Co.	Batavia	New York	134,400	
Various	Batavia	New York	108,000	242,400

GUAYULE.

JUNE 24. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	Akron	108,405	108,405
JUNE 26. By rail, at Laredo, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	58,000	58,000

GUTTA PERCHA.

JULY 14. By the S. S. *Dardanus*, at New York.				
United Malaysian Rubber Co.	Batavia	New York	78,600	78,600

GUTTA SIAK.

JULY 14. By the S. S. *Dardanus*, at New York.				
United Malaysian Rubber Co.	Batavia	New York	3,600	3,600

ANTWERP RUBBER ARRIVALS.

JUNE 18. By the S. S. *Anversville*, from the Congo.		
Société Anonyme Bungé (Compagnie du Kasai).....*kilos*		98,300
Société Anonyme Bungé (Comptoir Colonial Belgika).....		7,912
Société Anonyme Bungé (Compagnie du Congo Belge).....		28,490
Société Anonyme Bungé		2,440
Crédit Colonial & Commercial (Anc. L. & W. Van de Volde)....		4,500
Various		1,789
		143,431
JUNE 18. By the S. S. *Matadi*, from the Congo.		
Société Anonyme Bungé.....		2,115

(Compiled by Grisar & Co., Antwerp.)

BRAZILIAN EXPORTS AND IMPORTS OF CRUDE AND MANUFACTURED RUBBER—1915-1919.

EXPORTS.

	1915.		1916.		1917.		1918.		1919.	
	Kilos.	Milréis.	Kilos.	Milréis.	Kilos.	Milréis.	Kilos.	Milréis.	Kilos.	Milréis.
UNMANUFACTURED—										
Mangabeira	111,449	201,311	232,906	526,205	313,836	827,803	40,760	80,345	56,382	109,715
Maniçoba	3,499,160	9,676,775	2,394,138	7,595,142	2,089,504	5,716,046	405,044	1,092,845	945,583	2,040,626
Balata	4,050	8,059	.....	.....	1,099	2,055	3,370	8,425	36,118	166,407
Hevea	31,550,464	125,899,159	28,865,297	144,113,000	31,589,518	137,524,274	22,210,916	72,543,245	32,213,311	103,220,001
Sorva	185	425	2,360	5,133	4,168	10,065	1,600	2,958	170	204
Totals	35,165,308	135,785,729	31,494,701	152,239,480	33,998,125	144,080,243	22,661,690	73,727,818	33,251,564	105,536,953
Hevea:	The exports of *Hevea* from the Brazilian ports to foreign countries were as follows:									
From Manáos	13,176,624	59,956,751	12,990,975	70,850,060	14,033,845	66,494,666	8,255,754	28,040,599	13,999,389	47,572,459
Pará	17,444,889	62,721,369	15,189,178	70,182,664	16,826,956	67,210,805	13,523,585	42,474,083	17,763,054	53,854,334
Corumba	637,196	2,122,583	443,902	1,914,856	501,161	2,339,671	268,058	1,197,100	244,662	926,060
Other ports	291,755	1,098,456	241,242	1,165,420	227,556	1,479,132	163,519	831,463	206,206	867,148
Totals	31,550,464	125,899,159	28,865,297	144,113,000	31,589,518	137,524,274	22,210,916	72,543,245	32,213,311	103,220,001
Hevea:										
To United States	18,845,667	71,877,637	18,463,292	89,268,417	20,165,385	80,738,824	17,692,154	54,786,328	22,932,266	69,923,919
France	144,661	657,351	231,157	1,279,913	219,191	1,237,755	871,154	3,261,601	2,185,369	7,737,935
Great Britain	11,847,393	50,904,754	9,738,680	51,696,321	10,901,764	53,733,929	3,277,669	12,720,454	6,529,257	23,386,302
Uruguay	478,791	1,538,317	217,757	917,766	115,255	546,220	176,168	808,169	159,266	636,705
Other countries	233,952	921,100	214,411	950,583	187,923	1,267,546	193,771	966,693	407,153	1,535,140
Totals	31,550,464	125,899,159	28,865,297	144,113,000	31,589,518	137,524,274	22,210,916	72,543,245	32,213,311	103,220,001

IMPORTS.

	1915.		1916.		1917.		1918.		1919.	
	Kilos.	Milréis.	Kilos.	Milréis.	Kilos.	Milréis.	Kilos.	Milréis.	Kilos.	Milréis.
MANUFACTURED—										
Toys	1,809	20,708	9,293	93,255	5,865	75,465	8,161	89,060	2,555	46,522
Boots and shoes	.....	41,439	16,349	98,452	20,117	132,109	14,845	122,324	61,389	480,121
Tires and tubes for automobiles	438,322	2,274,478	547,314	3,164,200	513,511	3,546,593	345,273	2,552,605	650,669	5,087,981
Rubber in sheets	13,860	55,403	19,081	79,067	38,105	186,497	40,880	210,169	25,155	150,074
Hose	56,474	282,875	101,549	425,210	124,776	454,782	96,979	515,935	144,275	660,834
Solid Tires	43,069	124,628	141,928	508,220	128,410	411,368	80,639	232,369	159,778	509,871
Other rubber goods	129,504	994,980	234,020	2,230,552	172,200	1,780,896	191,339	2,309,476	323,993	2,735,291
Totals	683,038	3,794,511	1,069,534	6,598,956	1,002,984	6,587,710	778,116	6,031,938	1,367,814	9,670,694

The value of imports given is the c. i. f value of imports in Brazil, and, of course, does not include any taxes or duties payable after arrival at a Brazilian port. The value of exports is f. o. b. at the respective port of clearance in Brazil, appraised in accordance with the prices current at such port on the weight or quantities, gross or net, as the case may be, of the merchandise declared in the respective manifest, plus the cost of cartage, packing and loading charges and the export duties collected at the port of shipment. Freight and insurance being generally paid abroad are not included.

The coin in which values are given is the paper mil réis ($1), which during 1919 was on the average equivalent to $0.26 American currency. A kilo = 2.2 pounds.

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS DURING MAY, 1920.

	EUROPE.					NEW YORK.					GRAND
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	TOTALS.
Tancredo, Porto & Co.....*kilos*	63,970	1,158	26,644	55,680	147,452	81,730	15,037	67,627	33,182	197,576	345,028
General Rubber Co. of Brazil....	98,911	7,606	5,893	.....	112,410	107,000	7,761	44,526	73,213	232,500	344,910
Stowell & Co.	150,967	11,206	14,430	38,018	214,621	10,365	26,444	55,927	15,470	108,206	322,827
Ohliger & Co.	52,539	.....	.....	.....	52,539	52,595	9,005	4,301	20,713	86,614	139,153
Gomes & Co.	23,290	320	600	.....	24,210	.....	.....	.....	.....	.....	24,210
Higson & Fall	520	14	2,520	3,281	6,335	1,825	350	1,782	13,850	17,807	24,142
Semper & Co.	15,941	2,438	1,092	.....	19,471	.....	.....	.....	.....	.....	19,471
Amorim Irmãos	.....	.....	.....	.....	.....	.....	2,175	6,128	94	8,397	8,397
Oscar Ramos	3,530	.....	2,550	425	6,505	.....	.....	.....	.....	.....	6,505
Adelbert H. Alden, Limited	.....	.....	.....	.....	.....	.....	243	5,382	160	5,785	5,785
Moraes, Carneiro Co.	2,843	317	181	160	3,501	.....	.....	.....	.....	.....	3,501
Paulo Levy & Co.	.....	.....	2,574	52	2,626	.....	.....	.....	.....	.....	2,626
I. G. Araujo	560	80	220	80	940	.....	.....	.....	.....	.....	940
	413,071	23,139	56,704	97,696	590,610	253,515	61,015	185,673	156,682	656,885	1,247,495
In transit, Iquitos	176	1,838	640	495	3,149	9,699	32,537	7,788	112,058	162,082	165,231
Totals .....*kilos*	413,247	24,977	57,344	98,191	593,759	263,214	93,552	193,461	268,740	818,967	1,412,726

(Compiled by Stowell & Co., Manáos, Brazil.)

EXPORTS OF INDIA RUBBER AND CAUCHO FROM PARA AND MANAOS DURING MAY, 1920.

	EUROPE.					NEW YORK.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
Suarez, Filho & Co.....*kilos*	4,380	189	28	7,444	12,041	151,998	.....	22,185	57,082	231,265	243,306
Alfredo Valle & Co.	.....	.....	.....	.....	.....	75,583	10,871	17,697	15,692	119,843	119,843
J. Marques	.....	.....	.....	.....	.....	21,420	4,930	35,809	46,965	109,124	109,124
Berringer & Co.	.....	.....	.....	.....	.....	25,017	4,279	24,237	36,132	89,665	89,665
Ferreira, Costa & Co.	.....	.....	.....	.....	.....	.....	.....	.....	50,000	50,000	50,000
Stowell & Co.	19,976	.....	.....	.....	19,976	2,210	340	26,447	.....	28,997	48,973
Chamié & Koury, Limited	.....	.....	.....	.....	.....	9,010	.....	.....	17,771	26,781	26,781
Bitar Irmãos	.....	.....	.....	.....	.....	5,950	633	9,086	11,050	26,719	26,719
General Rubber Co.	.....	.....	.....	.....	.....	2,420	146	5,033	5,991	13,590	13,590
Sundries	69,196	4,480	5,321	782	79,779	12,655	137	2,090	.....	14,882	94,661
	93,552	4,669	5,349	8,226	111,796	306,263	21,336	142,584	240,683	710,866	822,662
From Itacoatiara	.....	.....	.....	.....	.....	5,040	360	3,560	3,840	12,800	12,800
From Manáos	413,451	23,059	56,484	97,616	590,610	253,515	43,685	58,713	57,212	413,125	1,003,735
Totals .....*kilos*	507,003	27,728	61,833	105,842	702,406	564,818	65,381	204,857	301,735	1,136,791	1,839,197

(Compiled by Stowell & Co., Pará, Brazil.)

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF MAY, 1920.

EXPORTED TO—	Belting. Value.	Hose. Value.	Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Soles and Heels. Value.	Automobile Tires. Casings. Value.	Automobile Tires. Inner Tubes. Value.	Automobile Tires. Solid Tires. Value.	Automobile Tires. All Others. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
EUROPE:																
Austria	.....	.....	.....	.....	.....	.....	.....	.....	$56,061	$8,645	.....	.....	.....	.....	.....	$64,706
Azores and Madeira Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$2	2
Belgium	$777	$129	$397	.....	.....	1,680	$1,415	$50	86,073	11,094	.....	.....	$5,048	$1,058	854	106,895
Bulgaria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200	.....	200
Czechoslovakia	.....	.....	.....	.....	.....	.....	.....	.....	21,334	1,812	.....	$10	.....	.....	.....	23,156
Denmark	.....	76	.....	.....	.....	42,801	34,365	.....	91,279	12,864	$20,523	.....	7,636	5,272	8,929	180,944
Finland	1,634	474	99	.....	.....	30,162	30,577	.....	27,281	10,839	26,856	.....	.....	.....	6,939	104,699
France	15,334	55	692	144	$724	117,602	79,323	.....	222,064	3,721	.....	1,000	20,938	78,555	30,161	452,567
Germany	678	.....	.....	.....	.....	.....	.....	.....	99,038	20,116	.....	20	715	.....	1,455	122,022
Gibraltar	.....	.....	.....	.....	.....	.....	.....	.....	1,108	.....	.....	.....	.....	.....	.....	1,108
Greece	2,127	61	1,488	12	50	132	140	620	43,159	10,097	.....	6	383	150	1,455	59,736
Iceland and Faroe Islands	.....	.....	.....	6,809	20,619	108	223	.....	675	90	.....	.....	1,436	.....	87	23,130
Italy	2,223	.....	.....	1	5	238	225	10,240	87,902	11,467	.....	.....	2,663	2,921	16,402	134,048
Malta, Gozo and Cyprus Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,500	1,500
Netherlands	112	15,617	5,244	.....	.....	2,016	2,656	.....	112,653	9,868	4,044	880	29,926	3,713	6,856	191,569
Norway	571	1,973	.....	18	47	58,744	44,745	.....	179,873	7,753	29,606	800	150,029	1,128	14,161	430,686
Poland and Danzig	.....	.....	.....	.....	.....	4,152	3,371	.....	35,394	400	.....	.....	1,130	.....	.....	40,295
Portugal	1,292	70	.....	394	1,975	.....	.....	.....	19,475	2,366	.....	49	9,654	1,501	1,878	38,260
Roumania	.....	2,887	1,799	.....	.....	110	245	.....	4,535	.....	.....	.....	8	200	37	9,711
Russia in Europe	899	1,118	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,017
Spain	1,109	1,098	641	152	490	57	67	1,378	186,682	34,262	27,933	1,898	5,023	6,911	13,880	281,372
Sweden	5,706	4,966	1,249	.....	.....	15,584	12,611	.....	339,095	66,686	32,690	2,358	16,678	3,294	25,642	510,975
Switzerland	242	1,485	445	.....	.....	17,932	15,740	.....	57,907	5,258	.....	.....	9,752	1,075	6,100	98,004
Turkey in Europe	.....	.....	641	.....	.....	1,402	1,373	.....	12,152	142	254	.....	2,018	538	180	17,298
England	15,511	29,517	1,684	6	35	172,936	136,185	1,030	317,041	10,665	10,000	.....	35,169	40,526	129,664	727,027
Scotland	.....	.....	2,956	.....	.....	14,560	10,024	.....	47,545	6,724	.....	.....	.....	.....	100	67,349
TOTALS, EUROPE	$48,215	$59,526	$17,335	7,536	$23,945	480,216	$373,285	$13,318	$2,048,326	$234,869	$151,906	$7,021	$298,206	$147,042	$266,282	$3,689,276
NORTH AMERICA:																
Bermuda	$1,043	$2,101	$202	62	$234	2,163	$2,760	$301	.....	.....	$337	$105	$240	$327	$700	$8,350
British Honduras	540	.....	.....	.....	.....	647	1,079	.....	$222	$475	.....	.....	4	7	330	2,657
Canada	23,634	13,609	11,109	2,125	8,458	10,955	13,842	1,998	102,905	40,240	13,784	3,602	25,162	34,607	220,149	512,499
Costa Rica	663	.....	94	.....	.....	.....	.....	877	539	5	.....	39	3,134	304	1,030	6,685
Guatemala	6,049	1,723	883	12	55	499	578	2,154	3,514	1,367	383	623	10,193	452	977	28,951
Honduras	105	807	507	.....	.....	522	783	490	2,392	599	1,465	918	620	210	1,143	10,039
Nicaragua	865	493	622	.....	.....	1,480	1,852	956	1,217	61	540	20	300	650	1,904	9,480
Panama	69	4,006	3,468	30	106	13,893	16,788	575	18,333	2,698	183	107	29,956	909	4,728	81,926
Salvador	.....	172	249	.....	.....	.....	.....	9,568	6,632	1,431	36	135	3,872	.....	409	22,504
Mexico	38,495	57,178	14,341	69	419	22,328	22,591	7,158	71,462	8,158	4,788	2,192	30,922	15,764	36,550	310,018
Miquelon, Langley, etc	.....	.....	.....	1,963	7,045	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	7,050
Newfoundland and Labrador	3,593	1,150	224	6,590	21,999	6,024	4,293	552	5,268	723	123	.....	2,658	153	902	41,638
Barbados	.....	.....	.....	.....	.....	402	542	.....	1,805	228	.....	113	80	.....	303	3,071
Jamaica	1,084	1,184	112	.....	.....	4,667	5,816	169	13,826	1,666	823	83	446	192	986	26,387
Trinidad and Tobago	.....	6	269	67	74	11,392	8,762	1,849	16,114	1,769	1,868	1,368	3,057	468	1,062	36,666
Other British West Indies	29	67	.....	.....	.....	3,351	3,745	19	3,671	333	460	317	73	56	205	8,975
Cuba	19,049	26,459	42,535	156	736	76,658	68,222	14,961	282,085	34,004	58,312	17,702	56,036	18,974	56,164	695,239
Virgin Islands of U. S	112	.....	.....	.....	.....	1,345	1,918	712	1,047	207	.....	10	.....	266	142	4,414
Dutch West Indies	.....	318	.....	.....	.....	1,447	2,145	128	1,427	166	4	28	84	85	289	4,674
French West Indies	.....	21	.....	.....	.....	.....	.....	.....	689	82	.....	9	890	.....	85	1,776
Haiti	108	270	5	18	51	195	338	44	2,834	660	444	1,180	859	903	2,049	9,745
Dominican Republic	51	1,026	1,046	.....	.....	383	656	787	23,756	3,904	2,961	919	6,661	2,527	2,446	46,740
TOTALS, NORTH AMERICA	$95,489	$110,590	$75,660	11,092	$39,177	158,351	$156,710	$43,298	$559,738	$98,776	$86,511	$28,870	$175,247	$76,854	$332,558	$1,879,484
OCEANIA:																
Australia	$4,248	$6,693	$3,068	.....	.....	.....	.....	.....	$73,380	$11,149	$7,354	$2,669	$3,000	$6,159	$13,874	$131,594
New Zealand	326	706	60	477	$1,402	384	$266	$8,567	130,982	7,987	4,194	.....	11,580	317	4,246	170,633
Other British Oceania	.....	.....	.....	.....	.....	.....	.....	.....	725	774	.....	.....	.....	.....	.....	1,499
French Oceania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	33
Other Oceania	.....	.....	.....	.....	.....	.....	.....	.....	486	32	.....	.....	.....	50	.....	568
Philippine Islands	13,535	17,556	11,353	1,238	2,282	6,082	7,071	7,695	148,732	11,783	17,323	2,557	20,841	8,241	13,556	282,525
TOTALS, OCEANIA	$18,109	$24,955	$14,481	1,715	$3,684	6,426	$7,337	$16,262	$354,305	$31,725	$28,871	$5,226	$35,421	$14,767	$31,709	$586,852
SOUTH AMERICA:																
Argentina	$823	$6,634	$2,299	60	$142	4,434	$7,966	$2,797	$384,542	$37,106	$2,384	$2,296	$34,057	$11,918	$25,760	$518,724
Bolivia	.....	.....	.....	.....	.....	.....	.....	.....	3,918	.....	.....	.....	3	137	629	4,687
Brazil	25,003	22,761	2,850	710	2,130	36,569	38,049	1,845	215,042	21,479	7,955	1,129	81,384	7,137	35,802	462,566
Chile	10,384	8,728	1,201	240	1,632	8,911	8,436	317	61,503	4,024	3,932	4,511	11,054	1,015	16,435	133,172
Colombia	.....	2,418	238	.....	.....	1,741	2,287	3,249	24,029	4,070	800	250	14,186	4,196	4,070	59,793
Ecuador	8	350	356	.....	.....	.....	.....	.....	3,213	139	.....	30	6,130	1,578	739	12,543
British Guiana	.....	81	195	.....	.....	2,878	3,198	.....	1,428	277	604	.....	170	.....	357	6,310
Dutch Guiana	.....	.....	.....	.....	.....	.....	.....	.....	428	.....	.....	4,500	.....	179	225	5,332
French Guiana	.....	.....	.....	.....	.....	.....	.....	.....	130	14	.....	.....	.....	.....	.....	144
Paraguay	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25	.....	117	142
Peru	305	1,380	123	.....	.....	1,194	1,762	.....	13,241	5,841	1,506	1,071	9,724	1,235	6,870	43,058
Uruguay	2,158	3,396	2,166	2	5	688	885	1,296	169,097	12,996	1,520	1,002	1,032	909	9,166	205,628
Venezuela	674	1,277	91	.....	.....	.....	.....	320	15,045	5,583	945	43	6,122	3,875	1,803	35,778
TOTALS, SOUTH AMERICA	$39,355	$47,025	$9,519	1,012	$3,909	$56,415	$62,583	$9,824	$891,616	$91,529	$19,646	$14,832	$163,887	$32,179	$101,973	$1,487,877

Asia:	Belting. Value.	Hose. Value.	Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Shoes and Heels. Value.	Automobile Tires. Casings. Value.	Automobile Tires. Inner Tubes. Value.	Automobile Tires. Solid Tires. Value.	Automobile Tires. All Others. Value.	Insulated Wire and Cables, Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber Value.	Totals. Value.
Aden	....	....	....	....	....	....	....	....	$2,217	$144	....	$378	....	....	....	$2,739
China	$2,443	$271	$1,032	....	....	474	$534	....	24,651	1,923	$250	675	$101,725	$5,852	$4,334	143,690
Chosen	....	60	....	....	....	....	....	....	....	243	....	....	148	....	92	543
British India	....	3,371	159	1	$2	466	469	$3,405	56,837	8,456	6,731	928	1,587	2,085	4,910	88,940
Straits Settlements	....	....	3,830	....	....	844	1,200	....	106,782	3,745	9,711	....	88	304	2,113	127,773
Other British East Indies	....	....	....	....	....	....	....	....	2,496	200	....	....	....	22	67	2,785
Dutch East Indies	....	2,788	650	....	....	....	....	....	188,714	10,574	85,674	459	1,024	2,035	3,125	295,043
French East Indies	....	....	....	....	....	....	....	....	555	....	....	....	40	....	....	595
Hongkong	....	489	2,495	24	108	2,770	3,119	....	1,687	....	....	....	3,364	89	1,369	12,720
Japan	8,800	14,766	11,375	1,152	3,589	45,078	49,227	....	78,238	4,358	1,168	4,232	2,402	83	34,410	212,648
Persia	....	....	....	....	....	....	....	....	....	....	....	....	....	857	5	862
Russia in Asia	....	33	....	....	....	....	....	....	....	....	....	....	....	....	....	33
Siam	....	....	....	....	....	....	....	....	2,500	....	800	131	....	10	103	3,544
Turkey in Asia	....	175	....	3	20	604	568	910	14,342	2,655	9,218	....	....	156	631	28,675
Other Asia	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Totals, Asia	$11,243	$21,953	$19,541	1,180	$3,719	50,236	$55,117	$4,315	$479,019	$32,298	$113,552	$6,803	$110,378	$11,493	$51,159	$920,590
Africa:																
Belgian Kongo	....	$735	....	....	....	....	....	....	....	....	....	....	....	....	$194	$929
British West Africa	....	....	....	....	....	....	....	$250	$99,550	$6,359	$986	$42	....	$11	4	107,202
British South Africa	$35,938	28,359	$13,459	13	$67	4,849	$4,403	2,171	166,037	12,959	222	605	$6,168	$2,372	18,942	291,702
British East Africa	....	....	....	24	96	....	....	140	5,375	1,098	1,200	....	....	....	22	7,931
Canary Islands	....	....	....	....	....	....	....	....	332	....	700	....	....	10	50	1,092
French Africa	7,656	....	....	....	....	....	....	....	6,058	588	722	250	....	....	2,100	17,374
Liberia	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	12
Morocco	....	....	....	....	....	65	116	....	2,293	198	....	....	....	21	....	2,628
Portuguese Africa	71	....	....	....	....	....	....	....	1,830	....	....	....	11	114	439	2,465
Egypt	....	4,112	....	....	....	15	30	....	15,593	1,733		10	1,985	118	592	24,173
Totals, Africa	$43,665	$33,206	$13,459	37	$163	4,929	$4,549	$2,561	$297,068	$22,935	$3,830	$907	$8,164	$2,646	$22,355	$455,508
Grand Totals	$256,076	$297,255	$150,001	22,572	$74,597	756,613	$659,581	$89,578	$4,630,072	$512,132	$404,316	$63,659	$791,303	$284,981	$806,036	$9,019,587

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES.

	Belting, Hose and Packing. Values.	Boots and Shoes. Pairs.	Boots and Shoes. Value.	Tires. Automobile. Value.	Tires. All Others. Value.	Insulated Wire and Cables. Value.	Druggists' Rubber Sundries. Value.	All Other Manufactures of Rubber. Value.	Totals. Value.
Hawaii	$18,873	....	....	$92,078	$14,516	....	....	$19,235	$144,702
Porto Rico	10,119	....	....	89,751	9,509	....	....	20,933	130,312
Totals	$28,992	....	....	$181,829	$24,025	....	....	$40,168	$275,014

(Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.)

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	May. 1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
Unmanufactured—*free:*				
India rubber:				
From France	165,219	$46,044	229,198	$50,430
Netherlands	......	......	370,737	163,888
Portugal	84,822	23,750	89,391	22,766
United Kingdom	2,702,208	1,299,935	9,017,369	4,067,994
Canada	94,343	42,816	3,070	1,751
Central America	88,606	23,879	19,901	7,842
Mexico	118,215	61,995	200,289	53,595
Brazil	4,523,797	1,319,498	3,216,017	824,988
Peru	86,584	34,212	114,308	33,794
Other South Am.	56,841	19,175	94,654	42,380
British E. Indies	42,842,093	17,628,968	22,843,746	11,137,937
Dutch E. Indies	4,254,278	1,774,146	7,195,829	3,177,985
Other countries	461,175	167,199	705,393	203,200
Totals	55,478,181	$22,441,617	44,099,902	$19,788,550
Balata	53,370	$25,826	19,127	$9,033
Guayule	565,652	142,285	206,946	42,043
Jelutong (Pontianak)	1,597,331	207,256	684,878	137,554
Gutta percha	744,486	116,722	246,589	48,446
Rubber scrap	1,451,278	119,573	1,081,244	78,757
Totals, unmanufactured	59,890,298	$23,053,279	46,338,686	$20,104,383
Chicle (dutiable)	493,477	$348,520	673,977	$434,544
Manufactured—*dutiable*				
India rubber and gutta percha	......	123,016	......	85,417
India rubber substitutes	48,532	3,626	......	......

EXPORTS OF DOMESTIC MERCHANDISE.

	1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
Manufactured—				
India rubber:				
Scrap and old	269,165	$28,049	1,254,641	$119,018
Reclaimed	207,303	35,021	757,178	125,814
Belting[1]	......	638,348	......	256,076
Hose[1]	......		......	297,255
Packing[1]	......		......	150,001
Boots[1]	21,243	57,762	22,572	74,597
Shoes[1]	185,707	154,440	756,613	659,581
Soles and heels[1]	......	......	......	89,578
Tires:				
For automobiles[1]	......	2,360,279	......	......
Casings[1]	......		......	4,630,072
Inner tubes[1]	......		......	512,132
Solid tires[1]	......		......	404,316
All other tires[1]	......	190,725	......	63,659
Druggists' rubber sundries[1]	......	126,296	......	284,981
Suspenders and garters	......	177,641	......	489,285
Other rubber manufactures[1]	......	796,068	......	806,036
Totals, manufactured	......	$4,564,629	......	$8,962,401
Fountain pens....*number*	34,620	$39,753	42,107	$35,133
Insulated wire and cables[1]	......	838,188	......	791,303

EXPORTS OF FOREIGN MERCHANDISE.

	1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
Unmanufactured—				
India rubber	374,738	$134,699	550,755	$239,368
Balata	23,240	15,250	202,100	121,460
Gutta percha	......	......	1	2
Guayule	......	......	25	31
Jelutong (Pontianak)	......	......	92,940	18,478
Rubber scrap	......	......	10,000	875
Totals, unmanufactured	......	$149,949	......	$380,214
Manufactured—				
Gutta percha	......	$8,000	......	$149
Totals, manufactured	......	$8,000	......	$149
India rubber substitutes	......	125	......	30
Chicle	70	130	......	......

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
Manufactured—				
To Alaska:				
Belting, hose and packing	......	$10,282	......	$25,431
Boots and shoes. *pairs*	9,900	24,212	504	1,588
Other rubber goods	......	4,608	......	3,856
Totals	......	$39,102	......	$30,875
To Hawaii:				
Belting, hose and packing	......	$6,718	......	$18,873
Automobile tires	......	78,569	......	92,078
Other tires	......	11,562	......	14,516
Other rubber	......	14,431	......	19,235
Totals	......	$111,280	......	$144,702
To Porto Rico:				
Belting, hose and packing	......	$1,868	......	$10,119
Automobile tires	......	15,230	......	89,751
Other tires	......	1,055	......	9,509
Other rubber goods	......	2,718	......	20,933
Totals	......	$20,871	......	$130,312

To Philippine Islands—treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries during May are given on pages 776-777 of this issue.

CUSTOM HOUSE STATISTICS.

PORT OF NEW YORK.

IMPORTS.

	May. 1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
UNMANUFACTURED—*free:*				
Crude rubber:				
From Belgium	.....	.....	296,404	$83,596
France	165,219	$46,044	229,198	50,430
Netherlands	.....	.....	370,737	163,888
Portugal	84,822	23,750	89,391	22,766
Spain	.....	.....	161,584	23,837
England	2,646,174	1,272,478	9,017,289	4,067,946
Canada	70,455	32,234	.....	.....
Costa Rica	3,278	1,577	223	80
Gautemala	.....	.....	380	95
Honduras	102	200	.....	.....
Nicaragua	61,604	16,009	6,547	2,377
Panama	2,343	434	7,041	2,648
Salvador	.....	.....	5,710	2,642
Mexico	61,995	118,215	65,514	24,645
Trinidad	1,972	1,073	.....	.....
Cuba	.....	.....	44,008	15,400
Bolivia	.....	.....	5,809	2,971
Brazil	4,523,797	1,319,498	3,216,017	824,988
Columbia	18,762	8,296	32,969	17,335
Ecuador	26,197	7,313	18,034	4,104
British Guiana	.....	.....	1,295	961
Peru	86,584	34,212	114,308	33,794
Venezuela	3,566	11,882	36,547	17,009
China	.....	.....	149,800	59,920
British India	4,050	1,863	357,558	112,063
Straits Settlements	15,021,616	6,160,984	16,172,710	7,965,075
British E. Indies	6,776,693	3,087,242	4,917,333	2,265,126
Dutch E. Indies	2,255,662	952,591	6,981,431	3,083,450
Philippines	120,286	51,030	.....	.....
Belgian Kongo	67,020	12,686	.....	.....
British W. Africa	78,057	15,876	18,473	2,609
Totals	32,080,254	$13,175,487	42,316,310	$18,849,755
Jelutong (Pontianak):				
From Straits Settlements	1,413,014	$189,262	402,665	$77,268
Dutch E. Indies	.....	.....	271,044	58,106
Totals	1,413,014	$189,262	673,709	$135,374
Gutta Percha:				
From England	169,813	$34,326	.....	.....
Straits Settlements	574,673	82,396	.....	.....
Dutch E. Indies	.....	.....	227,892	$43,122
British W. Africa	.....	.....	8,302	2,013
Totals	744,486	$116,722	236,194	$45,135
Balata:				
From Panama	17,312	$7,143	.....	.....
Colombia	13,369	6,155	16,380	$6,299
British Guiana	.....	.....	2,747	2,734
Venezuela	22,689	12,528	.....	.....
Totals	53,370	$25,826	19,127	$9,033
Reclaimed and rubber scrap	559,007	$58,020	751,095	$56,642
Totals, unmanufactured	34,914,774	$13,500,683	43,996,435	$19,095,939
Manufactures of rubber and gutta percha...*dutiable*	.....	24,133	.....	65,255
Rubber substitutes	48,532	3,626	.....	.....
Chicle .....*dutiable*	160,751	$99,144	431,274	$294,961

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED:				
Automobile tires	.....	$2,027,795	.....	$3,858,994
Inner tubes	.....		.....	391,995
Solid tires	.....		.....	346,685
All other tires	.....	177,575	.....	47,456
Belting	.....	431,255	.....	183,857
Hose	.....		.....	205,905
Packing	.....		.....	90,594
Rubber boots.....*pairs*	9,065	21,985	12,354	38,687
Rubber shoes.....*pairs*	145,588	108,849	524,633	452,906
Soles and heels	.....	.....	.....	56,439
Druggists' sundries	.....	94,098	.....	234,956
Other mfgs. of rubber	.....	$39,668	.....	495,931
Totals, manufactured	.....	$3,401,225	.....	$6,404,405
Insulated wire	.....	724,646	.....	724,506
Fountain pens...*number*	29,803	35,613	34,255	23,951
Suspenders and garters	.....	149,953	.....	421,714
Chewing gum	.....	$2,741	.....	112,369
UNMANUFACTURED:				
Reclaimed and scrap rubber	120,694	$25,299	847,050	$109,741

FOREIGN EXPORTS.

Crude rubber	10,675	$5,000	26,871	$11,933
Balata	23,240	15,250	202,100	121,460
Chicle	25	20	.....	.....
Rubber manufactures	.....	7,581	.....	149
Rubber substitutes	.....	.....	125	30
Rubber scrap	.....	.....	10,000	875

PORT OF NEW ORLEANS.

IMPORTS.

UNMANUFACTURED—*free:*				
Crude rubber:				
From Nicaragua	21,122	$5,727	.....	.....
Mexico	.....	.....	300	$68
Totals	21,122	$5,727	300	$68
Chicle	15,200	10,729	6,260	8,719

EXPORTS.

	May. 1919. Pounds.	1919. Value.	1920. Pounds.	1920. Value.
MANUFACTURED:				
Automobile tires	.....	$3,842	.....	$48,128
Inner tubes	.....		.....	7,699
Solid tires	.....		.....	1,155
All other tires	.....	272	.....	1,415
Belting	.....	6,532	.....	1,087
Hose	.....	.....	.....	4,923
Packing	.....	.....	.....	2,601
Rubber boots	106	268	16	35
Rubber shoes	3,982	3,993	9,251	12,546
Soles and heels	.....	.....	.....	2,525
Druggists' sundries	.....	990	.....	75
Other rubber manufactures	.....	688	.....	7,050
Totals	4,088	$16,585	9,267	$89,239
Insulated wire	.....	$2,264	.....	$6,900
Fountain pens	.....	6	.....	74
Suspenders	.....	2,007	.....	8,265
Chewing gum	.....	2,171	.....	2,174

PORT OF BOSTON.

IMPORTS.

UNMANUFACTURED—*free:*				
Crude rubber:				
England	56,034	$27,457	80	$48
Canada	.....	.....	3,070	1,751
Straits Settlements	73,800	33,490	6,900	4,665
British East Indies	30,280	8,490	.....	.....
Totals	160,114	$69,437	10,050	$6,464
Gutta percha	.....	.....	10,231	3,290
Rubber scrap	23,520	840	.....	.....
Rubber manufactures, *dutiable*	.....	3,871	.....	1,411

EXPORTS.

MANUFACTURED:				
Automobile tires	.....	$894	.....	$16,490
Inner tubes	.....		.....	249
Solid tires	.....		.....	1,061
All other tires	.....	39	.....	.....
Belting	.....	9,814	.....	3,742
Packing	.....	.....	.....	478
Hose	.....	.....	.....	2,062
Rubber boots	4,207	9,428	3,309	11,233
Rubber shoes	2,755	2,339	191,847	158,203
Soles and heels	.....	.....	.....	14,363
Druggists' sundries	.....	6,239	.....	6,208
All other manufactures of rubber	.....	46,124	.....	38,040
Totals	6,962	$74,877	195,156	$252,129
Insulated wire	.....	$1,386	.....	$872
Fountain pens	.....	.....	30	90
Suspenders	.....	6,081	.....	38,994
Chewing gum	.....	39	.....	.....
Rubber scrap	23,256	2,451	.....	.....

PORT OF SEATTLE.

IMPORTS.

UNMANUFACTURED—*free:*				
Crude rubber:				
From Canada	1,620	$566	.....	.....
China	112,000	44,800	.....	.....
Straits Settlements	10,574,759	4,345,763	111,970	$48,000
British East Indies	137,900	58,850	.....	.....
Dutch East Indies	53,375	24,018	.....	.....
Hongkong	38,080	15,232	180	90
Japan	41,640	25,230	.....	.....
Totals	10,959,374	$4,514,459	112,150	$48,090
Jelutong	92,900	$9,290	.....	.....
Rubber manufactures	.....	7	.....	$166

EXPORTS.

MANUFACTURED:				
Automobile tires	.....	$3,179	.....	$69,987
Inner tubes	.....		.....	7,335
Solid tires	.....		.....	7,335
All other tires	.....	347	.....	611
Belting	.....	4,223	.....	6,986
Hose	.....	.....	.....	12,222
Packing	.....	.....	.....	578
Rubber boots	236	1,100	229	1,042
Rubber shoes	1,730	1,903	39	38
Rubber soles and heels	.....	.....	.....	7,287
Druggists' sundries	.....	442	.....	123
Other rubber manufactures	.....	1,974	.....	2,963
Totals	1,966	$13,168	268	$116,507
Insulated wire	.....	$34	.....	$454
Fountain pens	.....	11	2,880	2,465
Chewing gum	.....	11	.....	702
Suspenders	.....	2,742	.....	1,422
Reclaimed rubber	70,400	563	44,634	1,765

PORT OF SAN FRANCISCO.

IMPORTS.

UNMANUFACTURED—*free:*				
Crude rubber:				
From Guatemala	60	$30	.....	.....
Straits Settlements	6,854,978	2,630,057	1,036,866	$601,766
British East Indies	570,400	184,313	.....	.....
Dutch East Indies	1,945,241	797,537	131,349	56,664
Hong Kong	2,120	1,272	.....	.....
Japan	.....	.....	34,944	17,748
Totals	9,372,799	$3,613,209	1,203,159	$676,178

PORT OF SAN FRANCISCO—Continued.

IMPORTS.

	May. 1919. Pounds.	1919. Value.	May. 1920. Pounds.	1920. Value.
UNMANUFACTURED—*free* (Continued):				
Rubber scrap and reclaimed	5,100	$2,520	11,169	$2,180
Jelutong	91,417	8,704	11,169	$2,180
Chicle	40,202	44,281	.....	.....
Rubber manufactures	.....	8,258	.....	482

EXPORTS.

MANUFACTURED:				
Automobile tires	.....	$146,453	.....	$173,286
Inner tubes	.....		.....	23,662
Solid tires	.....		.....	15,225
All other tires	.....	5,057	.....	1,038
Belting	.....	54,717	.....	31,354
Hose	.....	.....	.....	19,348
Packing	.....	.....	.....	24,436
Rubber boots	147	191	96	378
Rubber shoes	7,831	5,251	3,011	3,320
Soles and heels	.....	.....	.....	3,318
Druggists' sundries	.....	1,620	.....	7,685
Other rubber manufactures	.....	32,041	.....	32,150
Totals	7,978	$245,330	3,107	$335,200
Insulated wire	.....	$90,491	.....	$8,250
Fountain pens	1,072	962	.....	754
Suspenders and garters	.....	7,367	.....	3,157
Chewing gum	.....	852	.....	1,778
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber	4,000	200	179,118	8,901

REEXPORTS.

Gutta percha	.....	.....	1	$2
Rubber manufactures	.....	$4	.....	.....

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

	May. 1919. Pounds.	1919. Value.	May. 1920. Pounds.	1920. Value.
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	6,211,700	£638,041	1,081,200	£126,976
Federated Malay States	6,555,100	673,939	2,902,000	340,596
British India	666,100	67,463	1,347,500	157,435
Ceylon and Dependencies	3,464,400	352,028	1,537,700	169,157
Other Dutch possessions in Indian Seas	2,022,000	199,663	372,700	44,672
Dutch East Indies (except other Dutch possessions in Indian Seas)	120,700	12,910	638,600	75,987
Other countries in East Indies and Pacific, not elsewhere specified	425,800	49,118	188,300	21,079
Brazil	2,183,000	229,168	2,988,600	310,858
Peru	27,200	2,521	1,000	31
South and Central America (except Brazil and Peru)	104,700	9,589	16,200	1,590
West Africa:				
French West Africa	10,400	790	540,500	47,502
Gold Coast	6,000	633	500	22
Other parts of West Africa	202,900	18,651	76,000	5,957
East Africa (including Madagascar)	181,500	17,728	143,200	15,110
Other countries	62,200	6,184	199,900	18,493
Totals	22,243,700	£2,278,426	12,033,900	£1,335,465
Waste and reclaimed rubber	412,200	7,856	1,093,800	29,931
Totals, unmanufactured	22,655,900	£2,286,282	13,127,700	£1,365,396
Gutta percha and balata	319,800	50,593	980,100	174,813
*Rubber substitute	.....	.....	44,800	1,700

*Included in "Other Articles," Class III, T., prior to 1920.

MANUFACTURED—				
Boots and shoes...*dozen pairs*	3,297	£5,445	29,726	£79,943
Waterproofed clothing	.....	.....	.....	1,258
Tires and tubes	.....	148,255	.....	315,041
Insulated wire	.....	483	.....	2,197
Other rubber manufactures	.....	56,100	.....	63,202
Totals	.....	£210,283	.....	£461,641

EXPORTS.

UNMANUFACTURED—				
Waste and reclaimed rubber	602,900	£15,656	1,741,200	£36,204
*Rubber substitutes	.....	.....	167,700	7,562
Totals	.....	.....	.....	£43,766

*Included in "Other Articles," Class III, T., prior to 1920.

MANUFACTURED—				
Boots and shoes...*dozen pairs*	4,982	£14,647	13,752	£30,852
Tires and tubes	.....	466,277	.....	483,176
Waterproofed clothing	.....	97,635	.....	256,498
Insulated wire	.....	75,279	.....	142,619
Submarine cables	.....	37,344	.....	107,527
Other rubber manufactures	.....	235,933	.....	400,202
Totals	.....	£927,115	.....	£1,420,874

EXPORTS—COLONIAL AND FOREIGN.

UNMANUFACTURED—				
Crude rubber:				
To Russia	103,300	£13,351	6,500	£620
Sweden, Norway and Denmark	577,400	74,974	357,600	35,701
Germany	12,200	1,216	1,344,900	139,660
Belgium	450,500	40,901	274,000	30,975
France	1,844,900	219,843	3,345,900	400,825
Spain	30,500	2,883	32,300	3,786
Italy	1,378,300	145,616	704,100	86,833
Austria-Hungary	.....	.....	62,400	6,692
Other European countries	321,500	35,075	67,800	7,228
United States	2,863,100	279,496	4,713,600	554,515
Canada	487,500	48,880	449,300	52,663
Other countries	60,600	7,216	219,500	27,299
Totals, rubber	8,129,800	£869,451	11,577,900	£1,346,797
Waste and reclaimed	500	27	16,300	664
Gutta percha and balata	233,000	25,863	171,700	32,298
Totals, unmanufactured	8,363,300	£895,341	11,765,900	£1,379,759
MANUFACTURED—				
Boots and shoes...*dozen pairs*	2,337	£4,613	21	£197
Tires and tubes	.....	21,341	.....	10,941
Insulated wire	.....	25	.....	97
Other manufactures	.....	7,885	.....	6,040
Totals, manufactured	.....	£33,864	.....	£17,269

TABLE TO REDUCE POUNDS, KILOGRAMS, POUDS OR KINS TO TONS (APPROXIMATELY).

Pounds or Kilograms.	Pounds to Tons.	Kilograms to Tons.	
90,000,000	40,178	88,582	9
80,000,000	35,714	78,740	8
70,000,000	31,250	68,897	7
60,000,000	26,785	59,055	6
50,000,000	22,321	49,212	5
40,000,000	17,856	39,370	4
30,000,000	13,393	29,527	3
20,000,000	8,928	19,685	2
10,000,000	4,464	9,842	1
Pouds or Kins.	**Pouds to Tons.**	**Kins to Tons.**	
90,000,000	1,446,945	53,150	9
80,000,000	1,286,173	47,244	8
70,000,000	1,125,402	41,339	7
60,000,000	964,630	35,433	6
50,000,000	803,858	29,528	5
40,000,000	643,086	23,622	4
30,000,000	482,315	17,716	3
20,000,000	321,543	11,811	2
10,000,000	160,771	5,905	1

Millions	Hundreds of thousands	Tens of thousands	Thousands	Hundreds
*1	2	3	4	5

*Place decimal point before this number of figures from the end of the above results.

For example:

98,763,800 pounds or Kilograms. 654,250 Pouds or Kins.

For Pounds.	For Kilograms.	For Pouds.	For Kins.
40.178	88.582	9,646.3	354.3
3,571.4	7,874	803.8	29.5
312.5	688.9	64.3	2.3
26.7	59	3.2	0.1
1.3	2.9	0.8	0.02
0.3	0.7		
44,090.2 tons	97,207.5 tons	10,518.4 tons	386.22 tons

Kilograms = 2.2 pounds. Poud = 36 pounds. Kin = 1.3228 pounds.

(W. H. Rickinson & Son, London, England.)

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS).

1920.	Plantations.	Parás.	Africans.	Centrals.	Gunyule.	Manicoba and Matto Grosso.	Balata.	Miscellaneous Gum.	Waste.	Totals. 1920.	Totals. 1919.
January ...*tons*	17,799	2,620	821	111	....	....	....	....	....	21,351	7,235
February	29,681	2,456	558	265	34	....	....	....	....	32,994	17,456
March	28,533	2,463	514	23	114	3	113	983	1,252	33,998	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	....	45	1,059	224	28,666	97,410
June	12,911	1,352	427	27	164	....	7	552	164	15,604	16,319
Totals	134,403	12,809	3,610	550	504	13	187	3,406	2,088	157,570	194,789

(Compiled by The Rubber Association of America, Inc.)

THE MARKET FOR RUBBER SCRAP.

NEW YORK.

THERE has been practically no business in the rubber scrap market during the past month. With the exception of a few sales of tires, and an occasional inquiry for boots and shoes, the market has been dead.

The present weakness is primarily due to the low price of crude rubber and the general lack of rubber manufacturers' interest in raw material at this time. There is no apparent reason to look for improvement until fall, when the rubber mills are expected to resume operations on full time.

The following prices are unchanged since a month ago, and are nominal quotations:

QUOTATIONS FOR CARLOAD LOTS DELIVERED.

JULY 26, 1920.

Prices subject to change without notice.

BOOTS AND SHOES:			
Arctic tops	lb.	$0.01 @	
Boots and shoes	lb.	.07 @	.07¼
Trimmed arctics	lb.	.05¼ @	.06
Untrimmed arctics	lb.	.04¼ @	.05
HARD RUBBER:			
Battery jars, black compound	lb.	.01 @	.01¼
No. 1, bright fracture	lb.	.23 @	.24
INNER TUBES:			
No. 1	lb.	.15½ @	.16
Compounded	lb.	.09½ @	.09¾
Red	lb.	.08 @	.08½
MECHANICALS:			
Black scrap, mixed, No. 1	lb.	.03½ @	.04
No. 2	lb.	.02½ @	.02¾
Car springs	lb.	.03½ @	.04
Heels	lb.	.03 @	.03½
Horse-shoe pads	lb.	.03 @	.03½
Hose, air brake	lb.	.03½ @	.03¾
fire, cotton lined	lb.	.01½ @	.01¾
garden	lb.	.01½ @	.01¾
Insulated wire stripping, free from fiber	lb.	.03½ @	.04
Matting	lb.	.01¼ @	.01½
Red packing	lb.	.05½ @	.06
Red scrap, No. 1	lb.	.09 @	.10
No. 2	lb.	.06¾ @	.07¼
White scrap No. 2	lb.	.08 @	.09
No. 1	lb.	.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	lb.	.04¼ @	.04½
Bicycle	lb.	.02¾ @	.03
Standard white auto	lb.	.04¼ @	.04⅜
Standard auto	lb.	.03 @	.03¼
Stripped, unguaranteed	lb.	.02¼ @	.02½
White, G. & G., M. & W., and U. S.	lb.	.04¾ @	.05
SOLID—			
Carriage	lb.	.04 @	.04¼
Irony	lb.	.01 @	
Truck	lb.	.03½ @	.03¾

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

AMERICAN COTTON. New crop conditions continued to improve during the past month and the quotations for spot middling uplands steadily advanced from 38.75 cents on July 1 to 43.75 on July 24. Few sales were recorded, and the general market condition was quiet and steady with firm prices.

SEA ISLAND COTTON. Holders of Sea Island cotton are aware of their strong position and believe that average extra choice is worth about $1.25. The small supply and high price of Sea Islands practically eliminates this material from the tire fabric situation.

ARIZONA COTTON. There has been no change in the market conditions of a month ago. Practically all the crop has been sold and the few bales remaining are worth about $1.20 for average extra.

EGYPTIAN COTTON. The Egyptian market has shown some strength lately which does not seem warranted in view of the excellent new crop prospects. Cable advices state that this old crop is being manipulated by bull interests, and the demand is better than it has been for the last two months. High grade Sakel is quoted about $1.20; medium to low grades, $1.10 prompt shipment; medium grades of uppers can be bought around 70 cents.

DUCKS AND DRILLS. The market has been listless, the firmness of the cotton market acting as a brake on price declines of cotton goods.

RAINCOAT FABRICS. Conditions in the raincoat fabric trade are practically the same as last month. There is little or no buying and prices have not changed.

SHEETING. The market is very quiet with little or no buying of sheetings that are rather weak with many soft spots. The mills have caught up on orders and are anxious for business but the trade is not showing a disposition to buy. Improved business is not looked for until October 1.

TIRE FABRICS. The demand for tire fabrics that has overtaxed the mills for many months has been somewhat relieved by the general slowing down of the tire manufacturing industry. Cord fabrics are in greater demand than building fabrics, due to the steady increase in cord tire manufacture. In fact, many mills are disposing of their heavy stocks of 17¼-ounce building fabric. Prices are slightly lower than last month and quotations are largely nominal.

NEW YORK QUOTATIONS.

JULY 26, 1920.

Prices subject to change without notice.

ASBESTOS CLOTH:			
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	lb.	$1.00 @	1.10
2¾ lbs. sq. yd., brass or copper insertion	lb.	1.10 @	1.15
BURLAPS:			
32—7-ounce	100 yards	@	
32—8-ounce		@	
40—7½-ounce		8.50 @	
40—8-ounce		8.75 @	
40—10-ounce		11.00 @	
40—10½-ounce		11.50 @	
45—7½-ounce		11.50 @	
45—8-ounce		11.50 @	
48—10-ounce		@	
DRILLS:			
38-inch 2.00-yard	yard	.42½ @	
40-inch 2.47-yard		.36½ @	
52-inch 1.90-yard		.52½ @	
52-inch 1.95-yard		.51¾ @	
60-inch 1.52-yard		.65⅞ @	
DUCK:			
CARRIAGE CLOTH:			
38-inch 2.00-yard enameling duck	yard	.42½ @	
38-inch 1.74-yard		.48¾ @	
72-inch 16.66-ounce		1.20 @	
72-inch 17.21-ounce		1.24 @	
MECHANICAL:			
Hose	pound	.78 @	.82
Belting		.78 @	.82
HOLLANDS, 40-INCH:			
Acme	yard	@	
Endurance		@	
Penn		@	
OSNABURGS:			
40-inch 2.35-yard	yard	@	
40-inch 2.48-yard		@	
37½-inch 2.42-yard		@	
RAINCOAT FABRICS:			
COTTON:			
Bombazine 64 x 60	yard	.30 @	
60 x 48		.27 @	
Cashmeres, cotton and wool, 36-inch, tan		1.00 @	
Twills 64 x 72		.46 @	
64 x 102		.48 @	
Twill, mercerized, 36-inch, blue and black		.57½ @	
tan and olive		.55 @	
Tweed		.80 @	1.40
printed		.27½ @	
Plaids 60 x 48		.28 @	
56 x 44		.27 @	
Repp		.40 @	.45
Prints 60 x 48		.29 @	
64 x 60		.32 @	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:			
63-inch, 3¼ to 7½ ounces	yard	1.45 @	3.90
36-inch, 2¾ to 5 ounces		.85 @	2.25

IMPORTED PLAID LINING (UNION AND COTTON):			
63-inch, 2 to 4 ounces	*yard*	$0.95	@$1.90
36-inch, 2 to 4 ounces		.60	@ 1.15
DOMESTIC WORSTED FABRICS:			
36-inch, 4½ to 8 ounces	*yard*	.85	@ 1.90
DOMESTIC WOVEN AND PLAID LININGS (COTTON):			
36-inch, 3¼ to 5 ounces		.27	@ .35
SHEETINGS, 40-INCH:			
48 x 48, 2.35-yard	*yard*	.27½	@
48 x 48, 2.50-yard		.28	@
48 x 48, 2.70-yard			@
48 x 48, 2.85-yard		.25¾	@
64 x 68, 3.15-yard		.29½	@
56 x 60, 3.60-yard		.25½	@
48 x 44, 3.75-yard		.23	@
SILKS:			
Canton, 38-inch	*yard*	.65	@
Schappe, 36-inch		.85	@
STOCKINETTES:			
SINGLE THREAD:			
3½ Peeler, carded	*pound*		@
4½ Peeler, carded		*1.15	@ 1.15¼
6½ Peeler, combed		*1.80	@
DOUBLE THREAD:			
Zero Peeler, carded	*pound*	*.98	@ .98½
3½ Peeler, carded		*1.04	@ 1.04½
6½ Peeler, combed		*2.70¼	@ 2.70½
TIRE FABRICS:			
BUILDING:			
17¼-ounce Sakellarides, combed	*pound*	2.35	@
17¼-ounce Egyptian, combed		2.15	@
17¼-ounce Egyptian, carded		2.05	@
17¼-ounce Peelers, combed		2.25	@
17¼-ounce Peelers, carded		1.47	@
CORD:			
15-ounce Egyptian	*pound*	2.40	@
BICYCLE:			
8-ounce American	*pound*	1.50	@
10-ounce American		1.48	@
CHAFER:			
9¼-ounce Sea Island	*pound*		@
9¼-ounce Egyptian, carded		2.29	@
9¼-ounce Peeler, carded		1.71	@

*Nominal.

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1919, TO MAY 5, 1920.

		1919-1920.	1918-1919.	1917-1918.
To Liverpool	*bales*	244,774	191,214	159,125
Manchester		140,098	97,015	92,900
Other United Kingdom ports		145	5,537	138,276
Total shipments to Great Britain.		385,017	293,766	390,301
To France		47,646	48,786	20,711
Spain		9,080	13,482	4,684
Italy		24,341	33,033	22,651
Belgium		680	.....	.....
Switzerland		12,894	20,379	3,350
Holland		875	.....	.....
Portugal		630	.....	.....
Germany		3,812	.....	.....
Austria		10,550	.....	.....
Greece		104	4,463	550
Turkey and other countries		98	.....	.....
Total shipments to Continent		110,710	120,143	51,946
To United States		274,847	50,210	56,763
Japan		16,161	11,517	12,464
Total shipments to all parts		786,735	475,636	511,474
Total crop (interior gross weight), cantars[1]		4,826,342	6,315,841	

[1]One cantar equals 98 pounds.
(Compiled by Davis, Benachi & Co.)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

THERE has been much less congestion in freight transportation conditions during the past month and the situation will doubtless continue to improve. In practically all lines manufacturers find it impossible to satisfy the demands of their customers, although they are making strenuous efforts to do so. Prices generally have remained firm with a tendency to recede slightly here and there.

ANILINE OIL. Makers were behind in their deliveries early in the month with prices up to 35 cents. This was followed by a downward movement during the balance of the month till supplies were ample for the current demand and spot goods were selling at 32 to 33 cents.

BARYTES. Producers of barytes are strenuously endeavoring to overtake the demand upon their facilities. There has been little change in price noted. Quotations have held steadily at $23.50 per ton with some tendency to rise.

BENZOL. The supply has continued light. Manufacturers are behind and trying to catch up. The situation has led to changes in prices extending over the month from 23 cents to 35 cents for the pure grade and from 28 cents to 33 cents for the 90 per cent grade.

BLACKS. The market remains steady with prices unchanged.

CARBON-BISULPHIDE. Early in the month producers' stocks were cleaned out. Prices remained unchanged at 8½ cents under this condition.

CARBON-TETRACHLORIDE. The demand has held steady and fairly active. Prices have ranged from 10½ cents early in the month to 13 and 14 cents toward the latter part.

DRY COLORS. There has been a shortage of red oxides. The demand for dry colors in general has been steady, and prices unchanged.

LITHARGE. The situation is improving and the worst is said to be over as regards producing and shipping to meet the demand which continues to be very active. There will be no change in prices until a revision of the lead list takes place.

LITHOPONE. The old prices are announced to continue for the third quarter of the year. New plants and additions now under construction are rated to increase the lithopone output by 25,000 tons annually.

SUBLIMED LEAD. The demand for sublimed lead is active and deliveries are good with conditions of supply in eastern United States steadily improving. Prices hold at 10 to 10¼ cents.

SULPHUR. The market is steady and prices unchanged.

WHITING. The war-time situation has not yet been eliminated. Few, if any, receipts of chalk are coming in and the demand exceeds the supply.

ZINC OXIDE. All the plants are operating to capacity and extensions are being rushed. It is reported that in 1915 there were two producing companies in the United States with four plants; now there are 17 such companies with 23 plants. The chief demand is from the paint and rubber manufacturing industries, both of which are active.

NEW YORK QUOTATIONS.

JULY 26, 1920.

Prices subject to change without notice.

ACCELERATORS, ORGANIC.

Accelerene (New York)	lb.	$4.75	@
Accelemal	lb.	.55	@ .57½
Aldehyde ammonia crystals	lb.	2.70	@ 3.25
Aniline oil	lb.	.33	@ .34
Excellerex	lb.	.75	@
Hexamethylene tetramine (powdered)	lb.	2.80	@ 3.50
N. C. C.	lb.	.50	@
No. 999	lb.	.20	@
Paraphenylenediamine	lb.	2.70	@ 2.85
Thiocarbanilide	lb.	.50	@
Velosan	lb.	3.70	@
Vul-Ko-Cene	lb.	.35	@
Virol	lb.	1.60	@

ACCELERATORS, INORGANIC.

Lead, dry red (bbls.)	lb.	.12¼	@
sublimed blue (bbls.)	lb.	.10	@
sublimed white (bbls.)	lb.	.10	@
white, basic carbonate (bbls.)	lb.	.10½	@
Lime, flour	lb.	.02½	@
Litharge, domestic	lb.	.15	@
imported	lb.	*.17	@
sublimed	lb.	.12	@
Magnesium, carbonate, light	lb.	.11½	@ .13
calcined extra light	lb.	.60	@
calcined light	lb.	.35	@
calcined medium light	lb.	.30	@
calcined heavy	lb.	.07½	@
calcined commercial (magnesite)	lb.	.04	@
oxide, extra light	lb.	.67	@
light technical	lb.	.35	@
light, imported	lb.	.55	@
imported	lb.	.55	@

ACIDS.

Acetic, 28 per cent (bbls.)	cwt.	3.75	@ 4.50
glacial, 99 per cent (carboys)	cwt.	15.95	@16.70
Cresylic (97% straw color) (drums)	gal.	1.20	@ 1.30
(95% dark) (drums)	gal.	1.10	@ 1.20
Muriatic, 20 degrees	cwt.	$2.25	@$2.50
Nitric, 36 degrees	cwt.	6.50	@ 7.00
Sulphuric, 66 degrees	ton	20.00	@

ALKALIES.

Caustic soda, 76 per cent (bbls.)	lb.	.06¼	@ .07½
Soda ash (bbls.)	lb.	.05	@

COLORS.

Black:

Bone, powdered	lb.	$0.06	@
granulated	lb.	.11	@
Carbon black (sacks, factory)	lb.	.15	@ .30
pressed	lb.	.22	@
Drop	lb.	.05½	@ .15
Ivory black	lb.	.16	@ .30
Lampblack	lb.	.15	@ .45
Oil soluble aniline	lb.	1.00	@
Rubber black	lb.	.09½	@

Blue:

Cobalt	lb.	.25	@ .30
Prussian	lb.	1.00	@
Ultramarine	lb.	.18	@ .40
Rubber makers' blue	lb.	3.50	@

Brown:

Iron oxide	lb.	.04	@ .04½
Sienna, Italian, raw and burnt	lb.	.06½	@ .13¼
Umber, Turkey, raw and burnt	lb.	.06¾	@
Vandyke	lb.	.02½	@ .10

Green:

Chrome, light	lb.	.42	@ .70
medium	lb.	.42	@ .70
dark	lb.	.50	@ .70
commercial	lb.	.07	@ .15
Oxide I. R.	lb.	.75	@
Oxide of chromium (casks)	lb.	1.25	@
Rubber makers' green	lb.	3.50	@

Red:

Antimony, crimson, sulphuret of (casks)	lb.	.45	@
crimson, "Mephisto" (casks)	lb.	.60	@
crimson, "R. M. P."	lb.	.67	@
Antimony, golden sulphuret of (casks)	lb.	.20	@ .22
golden sulphuret (States)	lb.	.35	@ .40
golden, "Mephisto" (casks)	lb.	.33	@
golden, "R. M. P."	lb.	.33	@
red sulphuret (States)	lb.	.25	@ .30
vermilion sulphuret	lb.	.55	@
Arsenic, red sulphide	lb.	.17	@ .18
Indian	lb.	.14	@
Para toner	lb.	2.25	@
Red excelsior	lb.	.19	@ .22
Toluidine toner	lb.	4.25	@
Iron oxide, reduced grades	lb.	.15	@
pure bright	lb.	.17	@
Spanish bright	lb.	.05	@ .06
Venetian	lb.	.02½	@ .06½
Oil soluble aniline, red	lb.	1.75	@ 2.00
orange	lb.	1.65	@
Oximony	lb.	.18	@
Vermilion, American	lb.	.25	@ .30
artificial	lb.	.37	@
English quicksilver	lb.	1.65	@
Rubber makers' red	lb.	3.50	@ 4.00
purple	lb.	2.50	@

White:

Aluminum bronze, extra brilliant		.65	@
extra fine	lb.	.75	@
Lithopone, domestic	lb.	.08	@ .08¼
Ponolith (carloads, factory)	lb.		@
Rubber-makers' white	lb.	.11¼	@

Zinc oxide. American (factory):		C. L.	L. C. L.
Special	lb.	.10¾ @	.11
XX red	lb.	.10¼ @	.10½
French process (factory):			
White seal	lb.	.13½ @	.13¾
Green seal	lb.	.12½ @	.12¾
Red seal	lb.	.11½ @	.11¾
Azo (factory):			
ZZZ (lead free)	lb.	.10 @	.10½
ZZ (under 5% leaded)	lb.	.09 @	.09½
Z (8-10% leaded)	lb.	.08¼ @	.08¾

Yellow:

Cadmium, sulphide, yellow, light, orange	lb.	1.50	@ 1.65
red	lb.	1.85	@
Chrome, light and medium	lb.	.35	@
Ochre, domestic	lb.	.04	@
imported	lb.	.04½	@
Oil, soluble aniline	lb.	1.75	@
Rubber makers' yellow	lb.	2.50	@ 3.50
Zinc chromate	lb.	.54	@

COMPOUNDING INGREDIENTS.

Aluminum flake (carload)	ton	30.00	@
silicate	ton	35.00	@
Ammonium carbonate (powdered)	lb.	.17¾	@
Asbestine (carloads)	ton	35.00	@
Barium, carbonate, precipitated	ton	100.00	@
sulphide, precipitated	lb.	.05	@
dust	ton	110.00	@

Barytes, pure white (f. o. b. works)	*ton*	$28.00	@	
off color	*ton*	20.00	@	
uniform floated	*ton*	28.00	@	
Basofor	*lb.*	.06½	@	
Blanc fixe	*lb.*	.05½	@	
Bone ash	*lb.*	.10	@	
Carrara filler	*lb.*	.02	@	
Chalk, precipitated, extra light	*lb.*	.05	@	.05½
heavy	*lb.*	.04	@	.04½
China clay, Dixie	*ton*	22.00	@	
domestic	*ton*	9.00	@	20.00
imported	*ton*	19.00	@	24.00
Shawnee	*ton*	20.00	@	
Cotton linters, clean mill run, f. o. b. factory	*lb.*	.03	@	.04
Fossil flour (powdered)	*ton*	60.00	@	
(bolted)	*ton*	65.00	@	
Diatomite	*lb.*	.03	@	.04
Glue, high grade	*lb.*	.35	@	.45
medium	*lb.*	.30	@	.35
low grade	*lb.*	.20	@	.25
Graphite, flake (400-pound bbl.)	*lb.*	.10	@	.30
amorphous	*lb.*	.04	@	.08
Ground glass FF. (bbls.)	*lb.*	.03	@	
Infusorial earth (powdered)	*ton*	60.00	@	
(bolted)	*ton*	65.00	@	
Liquid rubber	*lb.*	.18	@	
Mica, powdered	*lb.*	.15	@	
Pumice stone, powdered (bbl.)	*lb.*	.05	@	.10
Rotten stone, powdered	*lb.*	.02½	@	.04½
Rubber paste	*lb.*	.19	@	.22
Rub-R-Glu	*lb.*		@	
Silex (silica)	*ton*	25.00	@	40.00
Soapstone, powdered gray (carload)	*ton*	12.00	@	
Starch, powdered corn	*cwt.*	5.12	@	
Talc, powdered soapstone	*ton*	20.00	@	
Terra blanche	*ton*	25.00	@	
Tripoli earth, air-floated, cream or rose	*ton*	50.00	@	
white	*ton*	52.50	@	
Tyre-lith	*ton*	130.00	@	
Whiting, Alba (carloads)	*cwt.*	1.00	@	
Columbia	*cwt.*	.80	@	
commercial	*cwt.*	1.40	@	
English cliffstone	*cwt.*	2.00	@	
gilders	*cwt.*	1.45	@	1.55
Paris, white, American	*cwt.*	1.75	@	
Quaker	*ton*	16.00	@	
Super	*ton*	30.00	@	32.50
Wood pulp, imported	*lb.*	.03¼	@	
XXX	*ton*	75.00	@	
X	*ton*	65.00	@	
Wood flour, American	*ton*	50.00	@	

MINERAL RUBBER.

Elateron (c. l. factory)	*ton*	60.00	@	
(l. c. l. factory)	*ton*	63.00	@	
Gilsonite	*ton*	75.00	@	
Genasco (c. l. factory)	*ton*	67.50	@	
(l. c. l. factory)	*ton*	69.50	@	
Hard hydrocarbon	*ton*	42.00	@	
K-X	*ton*	150.00	@	
K. M. R.	*ton*	40.00	@	65.00
M. R. X	*ton*		@	
Pioneer (c. l. factory)	*ton*	60.00	@	
(l. c. l. factory)	*ton*	65.00	@	
Raven M. R.	*ton*	50.00	@	70.00
Refined Elaterite	*ton*	175.00	@	
Richmond	*ton*	75.00	@	
No. 64	*ton*	44.00	@	
318/320 M. P. hydrocarbon	*ton*	50.00	@	
Robertson, M. R. pulverized (c. l. factory)	*ton*	82.50	@	
M. R. pulverized (l. c. l. factory)	*ton*	85.00	@	
M. R. (c. l. factory)	*ton*	62.50	@	
M. R. (l. c. l. factory)	*ton*	65.00	@	
Rubrax (factory)	*ton*	55.00	@	
Syntro, granulated	*ton*	85.00	@	
Walpole rubber flux (factory)	*lb.*	.03	@	

OILS.

Avoilas compound	*lb.*	.16	@	.18
Castor, No. 1, U. S. P.	*lb*	.20	@	
No. 3, U. S. P.	*lb.*	.19	@	
Corn	*lb.*	.18	@	
Corn, refined Argo	*cwt.*	18.06	@	
Cotton	*lb.*	.17	@	
Glycerine (98 per cent)	*lb.*	.23½	@	.24
Linseed, raw (carloads)	*gal.*	1.67	@	
Linseed compound	*gal.*	.85	@	
Palmoline	*lb.*	.15	@	
Palm, special	*lb.*	$0.17	@	
Peanut	*lb.*	.20	@	
Petrolatum	*lb.*	.10	@	
Petroleum grease	*lb.*	.07½	@	.09
Pine, steam distilled	*gal.*	2.10	@	2.25
Rapeseed, refined	*lb.*	.22	@	
blown	*lb.*	.22	@	
Rosin	*gal.*	.70	@	
Syntro	*gal.*	.70	@	1.00
Soya bean	*lb.*	.18	@	
Tar	*gal.*	.38	@	.42

RESINS AND PITCHES.

Balsam, fir	*gal.*	1.75	@	1.80
Cantella gum	*lb.*	.55	@	
Cumar resin, hard	*lb.*	.12	@	.16
soft	*lb.*	.10	@	.14
Tar, retort	*bbl.*	15.50	@	
kiln	*bbl.*	14.75	@	
Pitch, Burgundy	*lb.*	.10½	@	
coal tar	*lb.*	.01¼	@	
pine tar	*lb.*	.04	@	
ponto	*lb.*	.14	@	
Rosin	*bbl.*	16.95	@	21.75
granulated	*lb.*		None	
fused	*lb.*		None	
Rosin, K	*bbl.*	19.25	@	
strained	*bbl.*	20.00	@	
Shellac, fine orange	*lb.*	1.75	@	

SOLVENTS.

Acetone (98.99 per cent drums)	*lb.*	.26	@	
methyl (drums)	*gal.*	1.50	@	
Benzol (water white, 90%)	*gal.*	.33	@	.38½
Beta-naphthol	*lb.*	.89	@	
Carbon bisulphide (drums)	*lb.*	.08½	@	
tetrachloride (drums)	*lb.*	.12½	@	.14
Naphtha, motor gasoline (steel bbls.)	*gal.*	.32	@	
73 @ 76 degrees (steel bbls.)	*gal.*	.40	@	
70 @ 72 (steel bbls.)	*gal.*	.38	@	
68 @ 70 degrees (steel bbls.)	*gal.*	.37	@	
V. M. & P. (steel bbls.)	*gal.*	.29	@	
Toluol, pure	*gal.*	.35	@	.40½
Turpentine, spirits	*gal.*	1.80	@	
wood	*gal.*	1.78	@	
Oamaco reducer	*gal.*	.65	@	
Xylol, pure	*gal.*	.60	@	.65½
commercial	*gal.*	.35	@	.40

SUBSTITUTES

Black	*lb.*	.10	@	.21½
White	*lb.*	.11	@	.24
Brown	*lb.*	.15	@	.22
Brown factice	*lb.*	.10¾	@	.21¼
White factice	*lb.*	.12	@	.23
Paragol, soft and medium (carloads)	*cwt.*	18.58	@	
hard	*cwt.*	18.08	@	

VULCANIZING INGREDIENTS.

Lead, black hyposulphite (Black Hypo)	*lb.*	.39	@	
Orange mineral, domestic	*lb.*	.15¼	@	
Sulphur chloride (jugs)	*lb.*	.20	@	
(drums)	*lb.*	.08	@	
Sulphur, flour, Brooklyn brand (carloads)	*cwt.*	3.40	@	
Bergenport (c. l. factory)	*cwt.*	3.65	@	
Bergenport (l. c. l. factory)	*cwt.*	4.00	@	4.25
superfine (carloads, factory)	*cwt.*	2.00	@	2.25

(See also Colors—Antimony.)

WAXES.

Wax, beeswax, white	*lb.*	.68	@	
ceresin, white	*lb.*	.16	@	.20
carnauba	*lb.*	.45	@	
ozokerite, black	*lb.*	.65	@	
green	*lb.*	.65	@	
Montan	*lb.*	.26	@	
paraffine, refined 118/120 m. p. (cases)	*lb.*	.12	@	
123/125 m. p. (cases)	*lb.*	.12½	@	
128/130 m. p. (cases)	*lb.*	.14	@	
Sweet wax	*lb.*	.14	@	

PULMORE PULLEY TREAD.

Almost every user of belt driven machinery has experienced excessive belt slip or unusual wear due to a greater loading than that for which either the belt or pulleys were intended. There are various temporary remedies for these conditions, such as excessive belt tension or belt dressings. Two permanent cures for excessive slip are larger pulleys and belts, or a pulley having a friction surface equal to that of the belt.

Pulmore pulley tread is a chemically treated fibre compressed into sheet form and it is easily applied to any kind of pulley simply by soaking in water for a few seconds to loosen up the chemical compound. When dry, it sticks to the pulley face and gives it a frictional tread equivalent to leather. (Smith & Serrell, 90 West street, New York City.)

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